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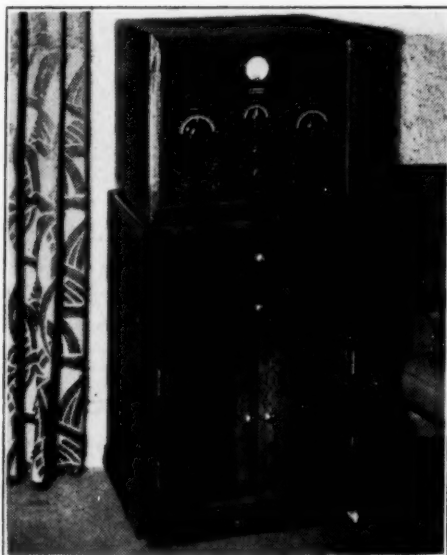
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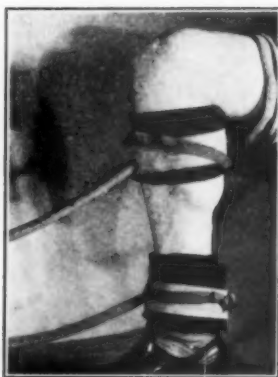


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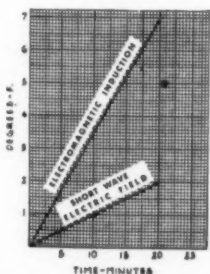


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## THE SCOTCH DOUCHE \*

### And Some Experimental Studies on Its Metabolic Influence

SIMON BENSON, Ph.D., and P. L. BERGSTROM, B.S.

CHICAGO

Any discussion of the origin of the use of water as a curative agent would necessarily have to be very limited because more than nine-tenths of its history lies hidden in the misty unexplorable past. However, the story of its growth and development into a scientific therapeutic agent is brief as to time, but quite complete as to achievement.

But it is not the purpose of this study to present either the "biography" or scientific development of hydrotherapy. We are concerned only with the presentation of some data collected by experimental investigation upon a limited but important phase of hydrotherapy. We feel, however, that a brief review of the evolution of this particular subject may prove interesting as well as helpful.

#### Evolution of Hydrotherapy

It was discovered quite early that water possessed not only certain invigorating and healing properties, but that these properties could be varied at will by altering the conditions under which the water was applied — such as, temperature and duration of the bath, and the accompanying mechanical stimulation.<sup>(1)</sup> To this can be added another condition of no small importance; namely, the extensiveness of the application — whether it be local or general.

All of these factors became important in determining both the immediate as well as secondary effects of the bath. Consequently, one of the interesting primary problems was how to vary and control these factors. To some extent success was attained in controlling some of the factors individually, but the prospects of controlling several of them simultaneously and independently, at the early stage appeared quite hopeless.

Early attempts to benefit from the temperature factor varied, no doubt, from utilizing the water obtained from hot springs, to a plunge into ice cold water. Between those two extremes, more moderate conditions and

changes were obtained by bathing either in the stagnant, sun-warmed waters of a shallow lake or in the cool swift-running mountain streams. Subsequently large tubs were built in which the water was heated either directly by a fire or by dropping previously heated stones into the water. This was a step forward, but this means of maintaining the temperature of the water within desirable limits was crude and unsatisfactory.

The other factor most difficult of control was mechanical stimulation. Early attempts to combine the reactions of warm water and mechanical stimulation, arose no doubt, from the sensations experienced by the bather in rubbing his body with the hands. The next step was obviously the administration of this hand-applied friction by another person — with the bather resting comfortably in a relaxed position.

That water in motion could exert considerable friction upon the body, and that the subsequent reaction could become highly stimulative, was learned from bathing in the swift mountain streams, and from subjecting the body to the impacts of moderate water falls. But since the waters of such rapid streams were generally quite cold, the administration of water with considerable mechanical force was limited in application. Attempts to attain the same kinetic condition with hot water were made by pouring it over the bather. This was, at best, a poor imitation. Later manual friction was applied simultaneously with the water stream<sup>(2)</sup>.

The next definite advance in the administration of baths, especially hot baths in combination with mechanical stimulation, is probably the system inaugurated by the inhabitants of Norway, Sweden and Finland, now generally spoken of as Finnish or Russian steam baths, of which many modifications are now to be found in this country. The chief improvement lies not only in the better method of regulating the temperature of the bath, but also in the administration of more intense mechanical stimulation.

\* From the Department of Physiology and Department of Physical Education, University of Chicago.  
Acknowledgment of assistance from the Crane Co. is hereby made.

These baths were taken in specially constructed log cabins in which the steam was produced by an intermittent pouring of water upon stones which were continuously heated in a big fire in the center of the room. Regulation of the temperature of the bath was quite efficient, as the several factors involved were all under a comparatively fair control. The size of the fire and the amount of water poured on the stones being the heating agents, excessive temperature of the room as a whole could quickly be lowered by partially opening the door. However, this was not all; temperatures of considerable variation were maintained simultaneously in the room. The degree of heat experienced depended upon the distance of the bather from the central fireplace, and also by his elevation from the floor. Strong seats or shelves were built at different heights along the walls, and the bathers could seek their individually preferred temperature by shifting from a lower to a higher shelf, or vice versa.

In addition to this better method of controlling the temperature of the bath, there was also the ingenious procedure of applying friction by rubbing the perspiring body with a more or less coarse herbage or heather. Then, too, aroma was often added to the "scene" by the steaming of pine needles; and the bath as a whole generally culminated by a plunge into a snow drift! The modern American "Turkish bath" room may have finer furnishings than these old log cabins, but one might justly question whether its treatments are any more invigorating.

While it may be true that such a vigorous bath, as above described, could be enjoyed only by the hardy bodies of the ancient Vikings, it should be remembered that this type of bath could be greatly modified to meet individual needs and limitations. For hundreds of years this kind of bath served well this entire northern population, and even today these original and crude log cabins may be seen in some of the more isolated parts of those countries.

Such brief historic review as this indicate that man learned slowly, but persistently, to resort to water applications as measures for increasing bodily vigor, and for the relief of pain. Unfortunately, as in every field of therapeutics, hydrotherapy was destined to suffer from a by-product of fanatical extremists shouting their usual exorbitant claims about their wares. Grossly misleading statements

were made concerning the curative properties of water, whether it was effected by imbibition, external application, or by the combination of these two. Those interested in a more detailed elucidation upon this subject should read Rause<sup>(3)</sup> among others.

Gradually, new and varied types of applications were evolved and tried, and later rejected or adopted according to experience. The measures surviving this eliminating process formed the basis for our present-day science of hydrotherapy. It is interesting to note that this prolonged selective process is characterized by a persistent effort to develop a bathing procedure which would deliver the combined effect of warm water and mechanical stimulation. The combined effect of cold water and mechanical stimulation could, as already stated, be obtained by standing under a mountain cascade, but there was no method of regulating either the temperature or the mechanical force with which the water was administered. The chief obstacle to overcome, then, in the development of an effective and satisfactory bathing procedure was to devise some method of readily varying, adjusting and controlling the *temperature* of the bath as well as the *mechanical force* with which it is applied — or rather the mechanical stimulation which accompanies it, since this may be applied independently by other means, such as the hands.

It was not, however, until the perfection of modern plumbing and allied industries, that the required conditions became available. Bath tubs of varied sizes and shapes, showers, douches and sprays afforded improved methods for delivering water at desired temperatures and modifiable pressures. The latter factor being at first emphasized chiefly in combination with sprays, showers and douches in which it was utilized to administer controlled mechanical stimulation to the body, but is now also utilized in other forms of water baths, such as the whirlpool and continuous flow bath.

It was but natural, perhaps, that there should be developed one superior combination — an apparatus which permits not only the application of water at any temperature within tolerance of the human skin, but also mechanical force or stimulation within the same limits. Not only can these two factors be applied simultaneously and varied independently, but both hot and cold water can also



be simultaneously applied, each with independent force. Finally, the bath may be of either a local or general nature. This superior equipment is known as the Scotch Douche.

### Scotch Douche

The highly stimulating and invigorating reactions obtainable from the Scotch Douche were unquestionably recognized after the construction of the first rough model. Attempts to explain these reactions on a physiological basis were soon made by the practicing hydrotherapist as well as by the more learned physicians and physiologists. The explanations and conclusions of Runberg and Winternitz, contemporaries in the latter part of the last century, are of interest even today, according to Runberg<sup>(4)</sup>.

The patient receives additional natural body heat, his general appearance improves rapidly, and the respiration becomes freer and easier, and the appetite is increased. The elimination consists of considerable phlegm from the respiratory tract, but especially impressive is the fact that the urine is given off in exceptionally large quantities — often in such great quantities that people (the patients) are horrified and ask whether or not it is dangerous, also much waste matter is eliminated with the urine. . . . In place of the previously mentioned treatment methods, as massage, gymnastics, or electricity, especially massage, one may with clear conscience prescribe the Scotch douche which not only replaces the other (agency) but also as to its effect far supercedes the same. The Scotch douche hammers and pounds, strikes and manipulates (upon) the whole body, and everything which is not loose is dissolved and carried off.

Platen<sup>(5)</sup> quotes Winternitz as follows:

The peculiar, specific property inherent in the douches is due to the manner and force with which the water strikes the body. Both a mechanical and a thermic factor are present. Water flows continuously down the body surface, and the individual particles make contact only momentarily. The thermic stimulation is therefore renewed continuously. In addition, there are those unique vibrations, caused by the impacting water, which in a more or less finely divided state strikes the body. In the combinations of these two, then, the unique mechanical and the powerful thermic stimulations, are to be found the causes of the specific action of the douche. The peripheral nerve endings, which have become sensitized by the sudden application of cold, are simultaneously exposed to the stimulation caused by the impacts of the water stream, and this double action elicits the unique stimulating effect.

To us the comparison is interesting, because, although the phraseology and context of one of the quotations reveals a more scientifically

trained author, both show a striking similarity in attributing the effect of the douche to the combined action of the thermic and mechanical factors. Readers interested in the more recently developed views on this problem are referred to the works of Baruch,<sup>(6)</sup> Riley,<sup>(7)</sup> Kellogg,<sup>(8)</sup> Wright<sup>(9)</sup> and others.

Considering the clinically established values, it appears that any physical therapy department which does not include hydrotherapy, is figuratively speaking, "running on only one cylinder"; and any hydrotherapeutic unit which does not include the Scotch douche, is on a similar basis, running — perhaps, on "four cylinders" — but also on "four flat tires." Personally, we regard the Scotch douche as the most all-around, valuable physical therapeutic measure, i. e., when it is properly administered. On the other hand it is equally dangerous and harmful when left in the hands of an inexperienced or careless operator. At present, it is probably either the most neglected or the most abused apparatus in the realm of physical therapy. It is to be hoped that before long this particular field of physical therapy will be given the front rank recognition it deserves. The desire to bring such recognition to a speedy realization served as a stimulus for the experiments recorded below.

### The Apparatus and Method of Application

The apparatus used in these experiments was one of the latest types developed, and which might be best described as an assemblage of pressure gauges, control valves and thermometers upon a table generally known as "Control Board," by means of which the operator can conveniently control the temperature and pressure as well as the quantity of water used in the treatment. The two pieces of hose, by means of which the water is applied to the patient, are also attached on top of the same table. The nozzle of each hose is supplied with a damper contrivance which permits a modification of the stream into a spray or "fan-douche."

The pressure of the Scotch douche can thus be regulated conveniently by three methods: (1) by the control valve; (2) by modifying the stream into a spray; and (3) by varying the length of the stream, i. e., the closeness of the patient to the nozzle of the hose. Conditions should permit a maximum distance of about 18 feet, although 12 to 15 feet are sufficient in the majority of cases. In our ex-



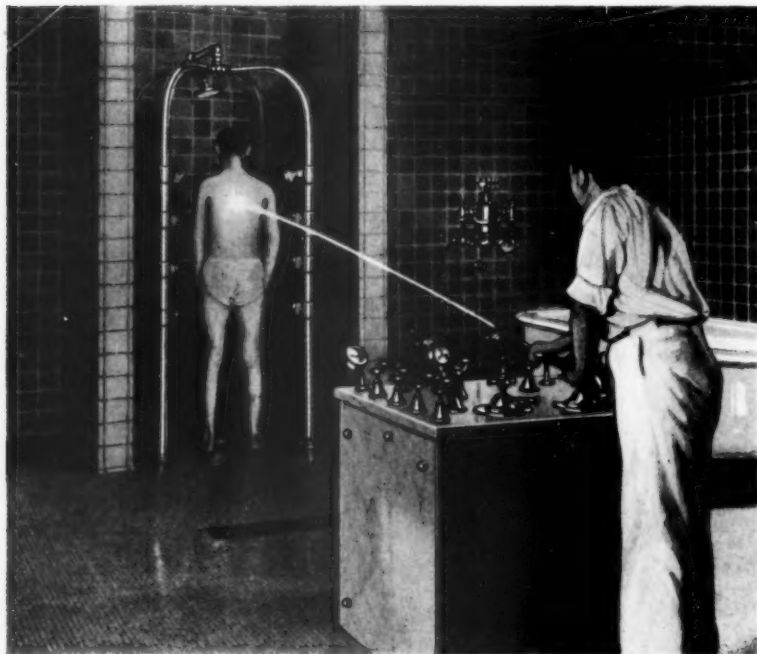


Fig. 1. — Apparatus and method of giving Scotch douche.

periments we were limited to a distance slightly more than 10 feet. The advantage sometimes sought in the longer stream is two-fold: (1) the stream has a chance to "break" before it reaches the patient, thus eliminating the cutting sensation produced by a solid stream; (2) the force with which the water strikes the body decreases with the length of the stream, and it is thus possible to keep the valve wide open and apply a larger quantity of water at a more tolerable pressure than would be possible at a shorter distance. To obtain a similar pressure with a short stream would necessitate the partial closing of the valve, and therefore a smaller stream.

The temperature control of the Scotch douche is equally if not more adjustable than the pressure. In one hose, the water is kept at some desirable cold temperature, while in the other it is adjusted to any desired warm temperature within the skin tolerance of the patient, and by means of a valve it may be quickly and accurately readjusted during the course of the treatment. The latter hose is used, by far, most extensively. The cold hose is used chiefly in conjunction with the hot one to obtain a prolonged series of rapidly alternating contrast (hot-cold) applications, and generally as a culmination to a prolonged

application of the hot hose to bring about a more vigorous reaction. This double hose combination — one always cold, the other warm or hot — constitutes one of the chief advantages of the apparatus, but it should not be overlooked that its therapeutic efficiency depends upon correct manipulation.

The temperature and pressure used in a Scotch douche treatment must, of course, depend on the individual tolerance of the patient, the type of injury or ailment, and whether or not the treatment is local or general. In general, the upper limit of temperature is around 120 degrees F., and that of pressure around 35 pounds. The duration of the treatment depends also upon individual tolerance and type of ailment.

In our experimental studies, however, it was of primary importance that all applications be of as nearly equal duration, temperature and pressure as possible, as otherwise the metabolic determinations would lack comparative values. Arbitrarily, a ten-minute treatment time was chosen. Hot water (114 degrees F.) was applied for nine minutes, and cold water (40-50 degrees F.) during the last, or tenth minute. The entire body was treated, the distribution being as follows: Three minutes on the back; two minutes on each side;

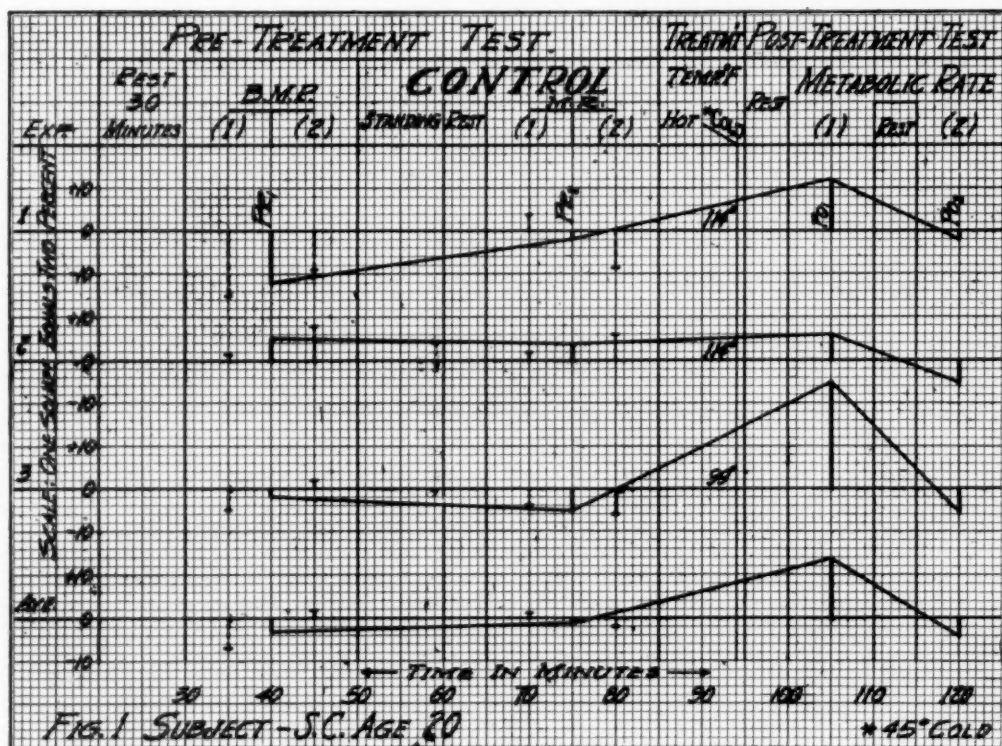


Fig. 2. — Ordinates: Metabolic rates in per cent in relation to the calculated basal rate. One square = two per cent. Abscissas: Time in minutes. One square = one minute. Thus in experiment 1, the basal metabolic rate ( $Pr_1$ ) which is an average of two runs, is seen to be about (—12 per cent); the control test ( $Pr_2$ ), also an average of two tests, is about (—2. per cent); the first post-treatment test ( $Po_1$ ), at the 105th minute, is (+12. per cent); and the second post-treatment test ( $Po_2$ ), at the 120 minute, is again (—2. per cent). For further detail see the text under "General Procedure." It might be well, perhaps, to emphasize here that since ( $Po_1$ ) was determined 15 minutes after the douche, it evidently does not represent the greatest metabolic activity induced. One might assume that the metabolic activity is greatest immediately after the douche, at the 95th minute, and that a decrease then sets in at a rate equivalent to the slope of the line  $Po_2 \rightarrow Po_1$ . If that be true, then, the maximum metabolic activity would be found by extending the line  $Po_2 \rightarrow Po_1$  to the 95th minute, which would give a maximum of over (100 per cent).

and two minutes on the front — the stream being changed to a spray when applied to the abdomen and groins. Finally, the cold water was applied, the entire body being covered in one minute. During the last 15 seconds, or thereabouts, the stream was changed to a spray, which was applied with a fan-like motion, to the entire body while the patient, with hands extended above the head, slowly rotated two or three times. Only one change was made in the above procedure. Each individual was subjected to one treatment in which one of the above factors was altered: the nine-minute application of water was given at 99 in place of 114 degrees F.

When the douche is applied as above described, it produces in general a high degree of vasodilatation, most noticeable, of course, in the cutaneous vessels. We are of the opinion, however, that this effect extends quite deeply into the tissues, because the force of

the water effectively compresses the tissues by mechanically squeezing out the fluids, thus permitting the deeper tissue layers to be affected more than would be possible with the fluids present. Objectively, the body becomes bright red — it looks "aglow"; and subjectively, the patient experiences a feeling of powerful stimulation and highly increased vigor.

The subjects chosen for these experiments were: A, football player, W. M., age 25; a swimmer, S. C., age 20; both varsity men in actual training during the test period. The other two subjects were taken from the normal run of individuals, and apparently in good health — one, S. B., 42 years of age, the other, P. B., 22 years.

#### General Procedure

All of our determinations were made in the morning before breakfast. With the usual

Sub.	Exp.	T.	$Pr_1 \rightarrow Pr_2$	$Pr_2 \rightarrow Po_1$	$Po_1 \rightarrow Po_2$
W. M.	1	114° F.	+10.3	-6.5	-2.0
"	2	114° F.	+16.0	-10.0	-6.0
"	3	99° F.	+7.3	-12.0	-0.5
Average:			+7.3	-9.5	-2.8
S. C.	1	114° F.	+10.7	+13.3	-14.0
"	2	114° F.	-1.0	+1.5	-10.0
"	3	99° F.	-3.5	+30.0	-30.0
Average:			+2.1	+14.9	-18.0
S. B.	1	114° F.	+0.3	+21.5	-22.0
"	2	114° F.	-12.5	+16.0	-24.0
"	3	99° F.	-2.5	+11.5	-6.0
Average:			-4.9	+16.3	-17.0
P. B.	1	114° F.	-1.0	+3.0	+2.0
"	2	114° F.	-2.8	+2.8	+3.9
"	3	114° F.	+3.7	+3.6	+2.7
"	4	99° F.	+12.5	+13.5	-19.0
Average:			+3.1	+5.7	-2.8

Table 1. — The numbers here do not represent metabolic rates, but the difference between such rates. For example, the numbers under  $(Pr_1 \rightarrow Pr_2)$  indicate the difference between the rates found at those points. Thus, the top figure (+10.3) indicates that the rate at  $Pr_1$  was 10.3 per cent higher than at  $Pr_2$  — though the latter rate may have been (-5), or (+7), etc.

precautions as to rest and food, the subject's basal metabolic rate ( $Pr_1$ ) was first determined. Next came the metabolic control test ( $Pr_2$ ) before which the patient was required to perform the same identical activities, as he would subsequently go through in taking the douche; and this was then followed by the metabolic test. The object was, of course, to ascertain to what extent these activities would influence the effects to be noted after the douche treatment.

The total time of one experiment was 125 minutes and distributed as follows: Rest, 30 minutes; two metabolic runs, 20 minutes; control activities, 10 minutes; rest, 5 minutes; control metabolic runs, 20 minutes; douche treatment, 10 minutes; rest, 5 minutes; metabolic run, 10 minutes; rest, 5 minutes; and final metabolic run, 10 minutes. (See Figure 1 for a graphic illustration of these experimental factors, of their distribution on a time basis, and of the metabolic variations obtained in three experiments on one subject.)

The heavy unbroken perpendicular lines represent the subject's metabolic rate at the time indicated in relation to his normal rate, calculated according to the DuBois' method as modified by Boothby and Sandiford of the

Mayo Clinic. Each base line represents such normal. A Benedict-Roth machine was used in making the tests. It should be noted that the two pre-treatment determinations at the 40th and 75th minutes are the averages of two runs, while the two post-treatment determinations, at the 105th and 120th minutes, are based on only one run each. For the sake of brevity, the two pre-treatment determinations will hereafter be referred to as  $Pr_1$  and  $Pr_2$ , and the two post-treatment determinations as  $Po_1$  and  $Po_2$ . Ten minutes were allowed for each metabolic run, as for example from the 115th to the 125th minute, and the result of such a run is then indicated in the middle of the time period, at the 120th minute.

### Results

With the general experimental procedure thus explained graphically in Figure 1, and since our main interest lies in the results obtained, i. e., in the metabolic changes produced consecutively between  $Pr_1$ ,  $Pr_2$ ,  $Po_1$ , and  $Po_2$ , we shall present all such data in a more compact form. In the following tables the numbers under  $(Pr_1 \rightarrow Pr_2)$  represent the metabolic changes, in per cent, induced by the

control-activities subsequent to the first B.M.R. determination. The numbers under ( $Pr_2 \rightarrow Po_1$ ) represent changes induced by the treatment, and those under ( $Po_1 \rightarrow Po_2$ ) represent the metabolic changes occurring spontaneously, during the time indicated. (See Fig. 1.) The column under "T" indicates the temperature of the warm hose during the first nine minutes of the treatment; the cold hose, applied during the tenth minute, was always around 45 degrees F.

### Discussion

Analyzing the graphs in Figure 1, the following is to be noted:

1. The subject's basal metabolic rates are within acceptable normal limits in relation to his theoretical rate as calculated by the Boothby-Sandiford method.

2. The metabolic changes ( $Pr_1 \rightarrow Pr_2$ ) induced by the control-activities, are not, on the whole, as great as had been anticipated. In only one run was there an increase (+10.3 per cent), while the other two runs resulted in losses (−3.5 per cent) and (−1.0 per cent); and the average of all the runs was a gain of (+2.1 per cent). As will be noted later, these figures are fairly close to the averages of all the subjects.

3. The metabolic changes ( $Pr_2 \rightarrow Po_1$ ) induced by the douche as recorded ten minutes after the application are all positive in character, and are greatest after the one at 99 degrees F., which gave an increase of 30 per cent as compared to increases of 13.3 and 1.5 per cent with the douche at 114 degrees F. The average effect of all the runs was a gain of 14.9 per cent. It would be more correct, however, to include in such averages only those results which were obtained from applications at similar temperatures (114 degrees F.), which in this case would be 4.7 per cent.

4. The subsequent spontaneous metabolic changes ( $Pr_1 \rightarrow Po_2$ ) recorded 25 minutes after the treatment, are all negative in character, and are here, too, of greatest magnitude after the douche at 99 degrees F., in which cases the loss (30 per cent) was numerically equal to the previous gain, ( $Pr_2 \rightarrow Pr_1$ ). The other two runs at 114 degrees F. produced losses, −14 per cent and −10 per cent. The average loss of all the runs was −18 per cent, and the losses induced at similar temperatures (114 degrees F.) average −12 per cent.

5. The douche application at 99 degrees F. causes, in the time indicated, a metabolic increase about four and one-half times greater, and a subsequent metabolic decrease two and one-half times as great as that produced by the douche at 114 degrees F.

6. The most uniform reaction in the three experiments is the marked drop in the metabolic rate between the 105th and the 120th minute; that is, ( $Po_1 \rightarrow Po_2$ ) is always negative regardless of whether or not there was any previous noteworthy rise from the application of the douche.

The subject of this particular series of experiments was a swimmer, and his reactions were chosen as examples because we felt that his more frequent exposure to water would help to inhibit emotional reactions and, therefore, make the results more accurate on a physiological basis. An examination of the data will show, we believe, that his reactions as a whole, conform closely to the average of the group, the only exception being after the application at 99 degrees F. when his reactions ( $Pr_2 \rightarrow Po_1$ ) and ( $Po_1 \rightarrow Po_2$ ) were greater than those of the other subjects.

The reactions obtained from all the subjects are tabulated in Table 1 on the basis discussed above. It gives not only each individual reaction at the different stages, but also each individual's average of all the tests, as well as at the different temperatures. (For a graphic comparison see Figure 2.)

The figures +13.1, (+4.7), −6.1 and −0.03 just to the right of the ( $Pr_1 \rightarrow Pr_2$ ) column are, as their positions indicate, the individual averages of the results from the tests at 114 degrees F. These results at 114 degrees F., however, carry no significance in relation to the results recorded in the same column after the 99 degrees F. application, since they were all taken before the administration of the douche. They are, therefore, supplied here to be compared with similar averages drawn from the results obtained subsequently in the corresponding experiments. In the other two columns, however, the averages drawn of the results from the tests at 114 degrees F. are of significance in relation to the results recorded after the tests at 99 degrees F., because any noticeable difference here, would quite naturally be attributed to the difference in temperature.

Viewing the data in column ( $Pr_1 \rightarrow Pr_2$ ) as a whole, we find that seven of the 13 de-



terminations resulted in losses — with an average of  $-4.0$  per cent, and six resulted in gains — with an average of  $+8.9$  per cent; and the average, derived from the algebraic sum of the 13 determinations, equals a gain of 1.9 per cent. It is interesting to note, too, that none of the subjects remained consistently on the positive or negative side; and if the average just derived should be substantiated by experiments on a larger number of individuals, the metabolic influence ( $Pr_1 \rightarrow Pr_2$ ), of the control activities under these conditions, would average about  $+2$ . per cent. The greatest variation from this figure, in the present series, is by subject W. M., who, in one test, dropped 6.5 per cent below this figure, and in another rose 14.0 per cent. The cause of such variations must, of course, remain somewhat obscure since all determinations were made in the morning before breakfast, with the usual precautions as to food and rest.

Examination of the data in the column under ( $Pr_2 \rightarrow Po_1$ ) reveals a somewhat different picture as to consistency in reactions. Three of the subjects show an increase in the metabolic rate in every test at all temperatures, while the remaining subject, W. M. shows a decrease in every test under the same conditions. The average change produced per treatment in W. M. was  $-9.5$  per cent, while the average change in the other three subjects as a group was  $+11.7$  per cent. Because of subsequent references in this article, it seems best to also call attention to subject P. B. whose reactions, although positive, were the smallest of the group. His average change from three applications at 114 degrees F. was only  $+3.1$  per cent; and the average change derived by including the test at 99 degrees F. was  $+5.7$  per cent.

Turning to the column under ( $Po_1 \rightarrow Po_2$ ) the results prove even more interesting. Three of the subjects show a decrease in the metabolic rate in every test, at every temperature, while the remaining subject shows a decrease in the test at 99 degrees F. only, and an increase in every test at 114 degrees F. This latter subject, however, is not W. M. as one would suspect, but P. B. to whom we called attention. His average reaction per test at 114 degrees F. was a *gain* of 2.9 per cent, as compared to an average *loss* of 8.8 per cent per test of the other three subjects as a group. The reaction of P. B. at 99 degrees F. appears more interesting

when compared with his own at 114 degrees F. Both the rise and fall of the metabolic rates — ( $Pr_2 \rightarrow Po_1$ ) and ( $Po_1 \rightarrow Po_2$ ) — are greatest at the former temperature; and, it might also be added, that only at this temperature, (99 degrees F.), did his skin react with that distinct reddish glow which generally results from a Scotch douche treatment. From this one may easily deduce that a douche at the latter temperature is a better metabolic stimulant than at 114 degrees F., but a glance at the ( $Pr_1 \rightarrow Pr_2$ ) factor in the same experiment causes one to hesitate. The latter is practically the same as is the ( $Pr_2 \rightarrow Po_1$ ) factor, thus indicating that there were other factors present which were causing a higher metabolic rate. The negative character and size of the ( $Po_1 \rightarrow Po_2$ ) factor, however, would be opposed to this latter deduction, as would also the fact that the average reaction of all the subjects at 99 degrees F. is greater than is the average of all the reactions at 114 degrees F.

#### Physiological Implications

The number of experiments in the present series is insufficient to serve as a basis for any definite deductions, but the following inferences may not be amiss.

We can think of no cause for the great deviation in results in the case of W. M., so clearly seen in Figure 2. This subject was of the "rough and tumble" athletic type, and possessed unusual athletic endurance. He always appeared cool and calm, never nervous and excitable. His only noteworthy physical deviation from normal was an unusually slow pulse — 48 per minute. This was verified subsequently in several experiments of a different type than here recorded, and must be accepted as a normal condition; but to attempt an explanation of our results on that factor appears somewhat too presumptuous at present.

The subject P. B., with general reactions more neurotic than lethargic, was not an athlete. Although evidently in good health, two physical deviations from normal may be worth noting. His skin appeared somewhat rougher and dryer than the average, and did not, as previously mentioned, respond so readily with a bright red glow as is usual after a Scotch douche. His medical record reads: "Occasional extra systoles."

His reactions at 114 degrees F. (see Fig. 2), appear quite the opposite in character to those of W. M., but not in such extreme degree;



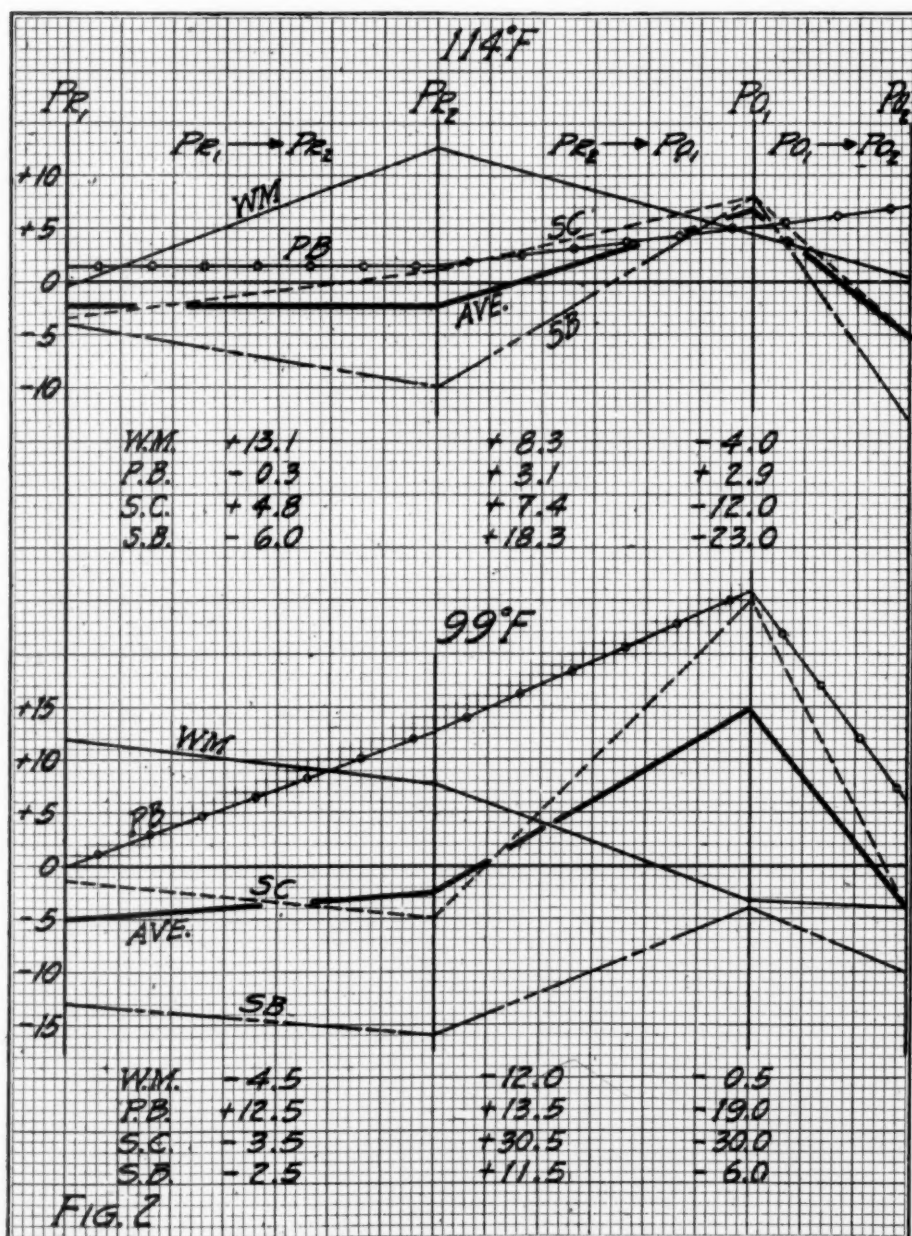


Fig. 3. — Ordinates: Metabolic rates in per cent in relation to the calculated basal rate. One square = one per cent. Abscissas: The distances between the points ( $Pr_1$ ), ( $Pr_2$ ), etc., are wholly arbitrary, but the points themselves carry the same significance as do the corresponding points in Fig. 1. At 114 degrees F. each line represents the average of the subject's reaction at that temperature. See table 1. The heavy black line represents the average of the results of all the subjects, except W. M. whose reactions varied too greatly from the others. Using his graph, at 114 degrees F. as a sample, we find that his basal metabolic rate ( $Pr_1$ ) was about (1 per cent), and that his control rate ( $Pr_2$ ) was (-12. per cent). This total change of (+13. per cent) is indicated in the column under ( $Pr_1 \rightarrow Pr_2$ ) as (+13.1). Similarly, (+8.3), in the next column to the right, under ( $Pr_2 \rightarrow Po_2$ ), signifies the change induced between points  $Pr_2$  and  $Po_2$ . See Fig. 1, and table 1. Finally, in the last column to the right, (-4.0) represents, the change in metabolic rate occurring between points  $Po_1$  and  $Po_2$ . Through an error the two last mentioned columns have been placed too far to the left. For example: the terms (+8.3) and (-4.0) should be directly beneath ( $Pr_2 \rightarrow Po_2$ ) and ( $Po_1 \rightarrow Po_2$ ), respectively.

( $Pr_1 \rightarrow Pr_2$ ) is slightly negative, and both ( $Pr_2 \rightarrow Po_1$ ) and ( $Po_1 \rightarrow Po_2$ ) are moderately positive. But when compared with the average group reaction, as indicated in Fig. 2, the relation becomes quite different. The ( $Pr_1 \rightarrow Pr_2$ ) reaction is quantitatively almost identical with that of the group average; the ( $Pr_2 \rightarrow Po_1$ ) factor is the same in character, though not in quantity, as that of the group average; and only in the last factor, ( $Po_1 \rightarrow Po_2$ ), do we find that P. B. deviated in character from the group average. It is interesting to note, however, that at the end of the ( $Po_1 \rightarrow Po_2$ ) period, the metabolic rate of P. B. was the same as that of the group average at the end of the ( $Pr_2 \rightarrow Po_1$ ) period. It appears, therefore, that the reaction of P. B. to the douche was less prompt but more prolonged, and that it might ultimately become greater, than that of the group average, and then perhaps to recede relatively just as slowly as it arose.

We are unable to establish any correlations between the physical conditions of the subjects W. M. and P. B. and the deviation of their reactions from that of the group average, as well as from each other. We have taken pains, however, to elaborate on them because they showed some marked variation in physical condition as well as in their reaction to the douche. The reactions of the other subjects may be observed on the graphs.

Having thus dealt sufficiently, we believe, with the reactions from the douche at 114 degrees F., it might be well to devote some attention to a comparison of these with those obtained at 99 degrees F. In Fig. 2, it is seen that the individual reactions at 114 degrees F. conform more closely to the group average than is the case at 99 degrees F. It is also significant, we believe, that not only does ( $Pr_2 \rightarrow Po_1$ ) equal ( $Po_1 \leftarrow Po_2$ ) numerically, in the group average of 114 degrees F., but a similar relationship exists between these two factors in the group average at 99 degrees F. It should be noted that the two factors at 99 degrees F. are more than twice as great as those at 114 degrees F. The conclusion appears justified, therefore, that the douche, as administered by us, is a much more effective metabolic stimulant at 99 degrees F. than at the higher temperatures.

If the above deductions hold true, it follows that the colder the douche, the greater the metabolic rise. It should be remembered,

however, that the cold application must not be so great in intensity and duration as to effectively cool the blood, as such a condition inhibits the dissociation of oxyhemoglobin<sup>(10)</sup>, thus leading to decreased metabolic activity. Within limits, then, especially as to the duration of the douche, this conforms to the results obtained by other workers.<sup>(7), (8)</sup> It should be noted, however, that a therapeutic application of this principle is greatly limited by the individual reaction (idiosyncrasy) of the patient — his ability to tolerate cold.

On first thought one would be prone to ascribe the increase in metabolic rate to a thermal rise due to the heat of the douche, but this is apparently not the case. Any rise in body temperature caused directly by the douche would be very small, and experimental evidence does not entirely substantiate a conclusion that the production of a moderate rise in body temperature by extrinsic agents causes a rise in the metabolic rate.<sup>(11), (12), (9)</sup> The increased B. M. R. must apparently be ascribed to some intrinsic action initiated by nervous reflexes<sup>(12)</sup> elicited by the douche. In other words, any noted rise in body temperature would be more logically attributed to increased metabolic rate than vice versa.

Part of the stimulation in question is no doubt due to the mechanical pressure of the douche — the massaging<sup>(13)</sup> or manipulating feature. The intermittent compression and expansion of the blood and lymph vessels caused by the stream, leaves little doubt about its effectiveness as a circulatory stimulant. Due to its physiologically passive nature, however, its actual effect as a direct metabolic stimulant may be questioned, but that it functions efficiently in dispersing and removing metabolic waste products can hardly be doubted.<sup>(13)</sup>

Before continuing with our conclusions, it might be well briefly to enumerate some physiologic conditions which appear necessary for the maintenance of normal metabolic function and health in the body or any part thereof. 1. Good circulation to the area considered; 2. Thorough diffusion of the area by blood; 3. A temperature of the area favorable for required metabolic processes; 4. Free venous return flow for the elimination of waste products. Any restraint exercised on any one of these four factors would automatically lower the efficiency of the system as a whole; but conversely, any efficiency added to any one of the factors would not become distributed

to an equal degree over the entire system. For example, a more favorable condition for metabolic activity alone, would not be of much use unless it were accompanied by a richer blood supply.

It appears, therefore, that in order to effectively improve the function of this system as a whole, all of these four factors must be stimulated. We know of no single therapeutic measure which can accomplish this — except the Scotch douche. It dilates the capillaries, permitting a richer blood supply in the area; it intermittently compresses the vessels forcing the fluids into their return channels, which in turn permits a freer inflow of arterial blood; and the temperature of the treated area is quite effectively controlled by the temperature of the douche.

There is, however, another factor in relation to the metabolic efficiency (factor 3) worthy of consideration. The metabolic rate is evidently controlled by various factors,<sup>(12)</sup> for example (1) the temperature of the blood, as already mentioned; and (2) nervous impulses originating in the skin temperature spots. Within limits, when these two factors undergo parallel changes, their influences, it appears, become antagonistic, the blood temperature predominating in one case, as in prolonged<sup>(10)</sup> cooling; and the nervous reflexes predominating in another, such as in brief<sup>(7)</sup> cooling. In general, it seems that the metabolic processes are augmented within limits by (1) warming the blood; and (2) by stimulating the cold spots in the skin. The latter impulses evidently serve as a kind of catalytic agent, or as physiological thermostatic controls; and conversely, the metabolic rate seems to decrease with a cooling of the blood and a stimulation of the skin hot spots, or "prolonged hot applications."<sup>(9)</sup> With this deduction in mind, we can not refrain from suggesting that the skin temperature mechanism seems to exercise the same relative control over the metabolic rate as it does over the heart rate,<sup>(14)</sup> but in reverse order.

If the above conclusion is correct, the ideal procedure for increasing the metabolic rate by means of such extrinsic agents, would evidently be (1) to flush the area to be treated with arterial blood; (2) maintain the blood at, or slightly above, body temperature; and (3) at the same time initiate nervous impulses

in the cold spots in the skin. This may be closely approached by the Scotch douche: The hot douche can, and usually is, intermittently replaced by a cold douche sufficiently brief so as not to cool the blood. However, proper adjustments<sup>(8)</sup> of the temperature and duration of such douches are, of course, necessary to attain the highest effects in metabolic stimulation; and such adjustments would furthermore have to be based on individual reaction, i. e., temperature tolerance.

Judged by the above inferences, the reason we obtained less metabolic increase at 114 degrees F. than at 99 degrees F. may be that the cold douche was too brief<sup>(8)</sup> in proportion to the temperature and duration of the hot one. Perhaps, if we had extended the cold douche to two, three or five minutes, the reaction after the douche at 114 degrees F. would have become much greater than the one at 99 degrees F. At any rate, it certainly appears logical that the reaction would vary if the temperature and time factors of the douche were altered.

In connection with the objective observations recorded above, it may be well to reiterate the subjective sensations experienced in taking the Scotch douche bath. Through the manipulation of the temperature, pressure, and duration, the douche may be made either sedative, or stimulating—or even irritating. The reaction from the douche, as administered by us, lies within the stimulative phase and creates in the subject a feeling of greatly increased vigor and power. The previously, perhaps tired and sluggish individual, steps out from the douche with light and springy steps. Certain it is that muscular sensibility has been affected, for the "sense of effort"<sup>(15)</sup> has been greatly decreased, and there comes, quite often, a temporary sensation of just "floating along." Whether or not this exalted feeling is due purely to nervous reflexes — changes in muscle tonus — or is chiefly the result of the effective "wash-out" of metabolic waste products, is, of course, speculative. Perhaps, it is a combined effect.

The value of some of these inferences — both as to the objective observations and the subjective sensations — we do not know, but, to us, some of them, at least, appear not only possible, but also quite probable; and if they were to serve no other purpose than as an avenue of approach for further studies, our present efforts will not be a loss.

### Conclusions

1. The Scotch douche apparatus is the most perfect fixture available at present for the application of water treatments at prescribed temperatures, and pressures. As an intrinsic agency to stimulate circulation and to control the metabolic processes it appears to be supreme.

2. Correctly manipulated the Scotch douche helps to: (1) dilate the small vessels; (2) hasten their emptying of venous blood and re-filling with arterial blood; (3) diffuse blood throughout the tissue treated; and (4) either augment or retard the metabolic processes by means of nervous reflexes initiated in the skin temperature spots, the exact effect depending upon the temperature and duration of the douche.

3. Of the four subjects used in our present series of tests, three manifested acceptably close reactions to the average of this group, while the fourth member, W. M. for some unaccountable reason, deviated greatly therefrom.

4. The metabolic increase induced by the douche, as administered by us, apparently did not persist for more than 15 to 20 minutes, and generally returned to normal in 25 to 30 minutes, except in one subject whose reaction seemed to be slower and more prolonged than the average.

5. The greatest individual reaction ( $Pr_2 \rightarrow Po_1$ ) at either temperature (99 or 114 degrees F.) was that of S. C. at 99 degrees F. who showed an increase of 30 per cent.

6. The greatest individual reaction at 114 degrees F. was that of S. B. who showed an increase of 21 per cent.

7. The average group increase at 114 degrees F. was 8.8 per cent; and that at 99 degrees F. was 18.5 per cent. Subject W. M. is not included in these averages because of his great deviation from the other members of the group.

8. The much smaller increase at 114 degrees

F. than at 99 degrees F. is thought to be due to a comparatively insufficient time-factor in the application of the cold douche after the former temperature.

9. Inferentially it seems plausible that the skin temperature mechanism exercises the same relative control over the metabolic rate as it does over the heart rate, but in reverse order.

### Reference

1. Clendening, Logan: *Methods of Treatment*, St. Louis, The C. V. Mosby Company, 1935, p. 398.
2. Graham, Douglas: *Massage*, Philadelphia, J. B. Lippincott Company, 1913, p. 161.
3. Rausse, J. H.: *The Water Cure as Applied to Every Known Disease*. 1850. Translated from German by C. H. Meeker.
4. Runberg, Peter: *Den Nya L  kevetenskapen*. Privately printed, Chicago, 1900.
5. Platen, M.: *Naturenliga L  kemetoden*, C. Grumbach, Leipzig, 1:740, 1904.
6. Baruch, Simon: *An Epitome of Hydrotherapy*, W. B. Saunders Co., Philadelphia, 1920.
7. Riley, W. H.: *The Reaction of the Body to the Short Cold Bath*, *Am. J. Surg.* 646 (June) 1928.
8. Kellogg, J. W.: *Rational Hydrotherapy*, Modern Medicine Pub. Co., Battle Creek, Mich., 1923, p. 463.
9. Wright, Rebekah: *Hydrotherapy in Hospitals for Mental Diseases*, Boston, The Tudor Press, Inc., 1932, p. 126.
10. Goldschmidt, S., and Light, A. B.: *The Effect of Local Temperature Upon the Peripheral Circulation and Metabolism of Tissues as Revealed by Gaseous Content of Venous Blood*, *Am. J. Phys.*, 73:146, 1925.
11. Abbott, G. B.: *Principles and Practice of Hydrotherapy*, Loma Linda, Cal., The College Press, 1914, p. 120, 151.
12. Bazett, H. C.: *Physiological Responses to Heat*, *Phys. Rev.* 7:555, 1927.
13. Kleen, Emil A.: *Massage and Medical Gymnastics*, London. J. and A. Churchill, 1918, p. 68.
14. Benson, Simon: *Relative Influence of External and Body Temperatures Upon the Heart*, *Arch. Phys. Therap., X-Ray, Rad.* 15:303 (May) 1934.
15. Howell, W. H.: *Philadelphia*, W. B. Saunders Company, 1921. *Text-Book of Physiology*, 8th Edition, p. 286.



## AIDS IN REHABILITATION \*

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The work of the physician is to make sick people well, to restore normal physiological function. Normal function presupposes not only a normal anatomical mechanism, but one which is kept at par by a reasonable amount of daily activity. This is axiomatic. A broken bone or a torn ligament will impair or abolish function of the part. Rest of the injured member until adequate healing results is necessary, but long fixation in retentive appliances will cause a forfeiture not only of mobility, but also of strength. This applies not only to muscles and ligaments, but also to bone itself, decalcification of which is readily demonstrable in the x-ray after even short periods of immobilization. This is in harmony with the general law that a tissue receives enough, and only enough, nourishment to meet its functional needs. Circulation approaching normal is therefore of prime importance in every healing process.

Physical therapy is one of the important aids in stimulating circulation and therefore also in the restoration of function of the injured part. Of the many varieties of physical therapy, active exercise probably deserves first place because of its wide applicability and because it calls into play the entire neuromuscular units in a manner approaching normal physiological action.

### Sling Suspension Exercises

Some ten years ago the writer described the "sling suspension" method of exercise as an aid in restoration of muscle power in infantile paralysis. The method has been employed by us for this affection ever since, and has also been found useful in many other conditions. Briefly, the method consists in supporting the arm or leg to be treated in a sling suspended from overhead, thus eliminating the weight of the extremity as a hindrance during movement. The adaptability to upper and lower extremities, as well as the fact that the method can readily be taught to laymen, makes further mention of the method worth while. These

exercises are helpful in allowing the patient to translate even minimal and scarcely appreciable muscle power into active and readily demonstrable motion through a fair arc. The fact that even slight gains are recognized by the increase in range of motion is of great importance in spurring on the instructor and the patient to continued efforts in the long and tedious process of restoration of muscle power. The method is so simple that it can be employed to advantage in the case of even very young children. Resistance may be added, as indicated, in carrying out the exercises.

It is well at the outset to have the power of the muscles, or muscle groups, of the upper and lower extremities charted, the values being roughly estimated on the basis of 100 per cent, or listed respectively as "normal, good, fair, poor, trace, and zero," so that on comparison, at suitable intervals, some information may be obtained as to the rate of progress or perhaps cessation of progress.

If after a period of gradual improvement, the condition remains stationary for a period of six months or more, it is reasonable to assume that no further noteworthy improvement is likely. Continuance of efforts under such conditions is merely a waste of time of both patient and instructor.

Having determined which muscles are to be exercised, the attendant is instructed in the proper arrangement of the slings and overhead supports, and in carrying out the exercises as prescribed for the individual patient. The physician, or physical therapy technician, if one is available, should have no difficulty in a few short demonstrations in teaching the mother or nurse the maneuvers necessary in each particular case. Occasional checking up and supervision of exercises by the physician is desirable.

In the average case of infantile paralysis, because of the long duration of treatment, it is not practicable to have the child brought to institutions daily or several times daily for treatment by skilled technicians. Neither is it practicable to have these workers visit the children in their homes as often as treatment

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is indicated. Exercise periods, for the most part, should be brief to avoid fatigue, but they may be, and usually should be repeated frequently during the day with proper rest periods intervening. We have found that the average lay mother requires but a few practical lessons in order to acquaint her with the relatively small number of special procedures applicable in a case at hand. She can be taught to carry these out fairly satisfactorily, even though she does not understand the physiological principles involved. Such a program, of course, requires occasional supervision and correction of errors, also modification of the program from time to time.

In the case of the lower extremity the use of the roller skate or ball-bearing device attached to a shoe, has been found an advantage in facilitating early motion. This contrivance has been found very helpful in fractures of the lower extremity. With the ball-bearing under the heel and the lift under the knee, regulated by the patient himself, the gentlest movements in flexion and extension can be executed, just as much assistance being given as the case may require and without danger of injury if ordinary care is used. Resistance in the shape of push and pull by the attendant may be added. This arrangement provides for flexion and extension of both knee and hip as well as for abduction and adduction of the hip.

This type of exercise will be found useful, especially in fractures of the neck of the femur. The constant tendency of the thigh and foot to rotate out, combined with attempts at motion without adequate protection, frequently results in the gradual giving way of the soft callus and in non-union.

Other conditions in which sling suspension may be employed with benefit, include spastic paralysis, especially of the lower extremities, atrophic arthritis, as well as in cases of weakness and stiffness after fracture or injury. In spastic paralysis it has frequently been found of advantage to attach a heavy weight to the sling, transforming it essentially into a weighted pendulum. The patient's arm or leg is placed in the sling and the pendulum is put into motion by the instructor, the patient being taught to continue the swinging with and without resistance. It is felt that a good start may be made in this manner in developing the sense of rhythm and in the teaching of gentle coördinate movement.

In arthritis, active motion within the pain-free range is without doubt a factor of considerable importance in maintenance of normal physiologic joint activity. The alternate contraction and relaxation of muscle groups and their antagonists must be of help in improving the circulation. As the muscles contract the lymph vessels and veins are compressed, the blood and lymph being hastened in the proximal direction. As the muscles relax these vessels are filled from the capillary side, the capillary system in turn drawing on the arterial supply. In this manner capillary stasis is overcome, and definite acceleration of the blood stream results. All the tissues of the part, including those of the joint, are benefited by the improved circulation. Cell growth, repair, and defense, as well as elimination, are enhanced. It is felt that the use of the ball-bearing device in atrophic arthritis is of especial value, since, with the apparatus in place, the patient can exercise frequently for brief periods, always within the pain-free range. Practically all the joints of the lower extremity, and those of the upper extremity as well, are brought into play, the latter through the rope and pulley hand control.

#### Under-Water Exercise

Of perhaps equal importance as an aid in muscle training are under-water exercises. While suitable for infantile and other types of paralysis, atrophic arthritis, weakness and stiffness of the extremities after injury, this type of exercise will be found useful as well in many instances in the field of internal medicine, neurology, and psychiatry.

The buoyancy of water eliminates gravity and the warmth of the water relaxes the muscles and accelerates the blood flow. The steady, gentle resistance of the water is readily overcome even by feeble muscles. The degree of resistance varies with the speed of motion.

The large pools, indoor and outdoor, are used mostly in the treatment of infantile paralysis and spastic paralysis. The most desirable temperature for infantile paralysis is about 91 degrees F. For spastic cases a slightly higher temperature, about 95 degrees F. is desirable to produce greater relaxation. It is doubtful whether the great sacrifices, financial and otherwise, made in many instances to provide pool treatment are justified by the results. The ordinary tub in the average home will answer very well except in unusual cases. It

has the advantage that the temperature can be regulated to suit the individual and that the water is renewed for each bath.

While the best results can probably be obtained by specially trained instructors it is believed that the physician or competent technician can teach a mother or attendant the necessary exercises in each individual case with a minimum of expense and with results which will probably very favorably compare with treatment in the large pool.

We have found the so-called Hubbard Tub,<sup>(1)</sup> which is gaining favor in many hospitals, very helpful. We would be loath to do without this important part of our physical therapy equipment. Such a tub installed in a room in a general hospital will prove very helpful in all cases where wide abduction movements of arms or legs are very desirable.

#### Over-Head Trolley System

By means of an over-head pulley the patient is gently hoisted on a hammock from the bed, and carried by trolley to a position directly over the tub, and then gently lowered into the water. Under-water massage and active and passive exercises, as well as resistance exercises, are then readily administered according to the needs of the individual case. Aside from the buoyancy of the water, nervousness is allayed and patients frequently drop into a sound sleep after the bath. The need for narcotics is diminished and the morale of the patient is supported by the realization that definite progress is being made.

Caution must be exercised to avoid fatigue, both general and local. There is perhaps a natural tendency to err in this respect because it is more or less of a chore to get a patient into the pool or tub, and once in the water both patient and instructor are apt to overstep safe limits. No general rules can be laid down. Careful observation of the patient while in the tub and during the first few hours following, will be necessary to detect evidence of fatigue.

In infantile cases muscles will often be found to show signs of fatigue after four or five efforts; therefore, frequent rest periods are indicated. In cases of injury it will rarely be advisable to keep the patient in the tub more than twenty or thirty minutes. It is felt that both sling suspension and underwater exercises are of particular value because they permit early active function. They rank first

among physiotherapeutic measures because they call for function of the neuromuscular unit as a whole. This unit is composed of the motor cell in the brain cortex sending its axon down the pyramidal tract to contact with the lower motor neuron in the spinal cord. The axon of the latter in turn contacts with the contracting muscle cell. In addition, the inhibitory mechanism is called into play, so that finely graduated precise movements are possible. Again every voluntary muscle contraction is accompanied by a corresponding relaxation of antagonistic muscles. The voluntary effort automatically calls into play every portion of this complicated mechanism, which cannot be claimed for other agencies.

While the beneficial effects of such simple exercises for normal as well as injured parts are readily appreciable both to the patient and physician and attendants, and presumably attributable to improvement of circulation, it is desirable to have some scientific explanation for this improvement. Moving pictures of the circulation in the rabbit's ear and the effect of a rise of surrounding temperature on the circulation, prepared by Clark and Swenson of the department of anatomy of the University of Pennsylvania, are of interest in this connection. These show that, while at ordinary temperature the circulation through the capillaries is slow, one may say sluggish, a moderate rise in temperature is accompanied by a very marked increase in the rate of flow. That exercise exerts a similar influence has been established by Goldschmidt and Light. They showed that the number of open capillaries in a given area of skin surface is more than doubled by exercise, that heat also increases their number, while cold decreases their number in marked degree. In this connection, too, the work of Wright and Marquardt is of interest. They studied the capillaries in the nail bed of the finger and found that while in a normal, active individual the capillaries were rather closely packed in hair-pin-like loops, those of the crippled arthritic hand were much less numerous and narrower, indicating that the little used, crippled hand was receiving a minimum of blood.

Finally I believe it is fair to say that we are too apt to think of physical therapy only in connection with injuries when, as a matter of fact, there is a large field for this branch of therapy in general medicine, surgery, and their specialties. I recall visiting the clinic of Pro-

fessor Bardenheuer in Cologne in 1912. He had all his fracture cases in one large ward and made it a rule that when he entered the ward the patients immediately started carrying out certain exercises, not for the fractured limbs which may have been encumbered by splints or plaster casts, but for the uninjured limbs for the purpose of keeping up their general muscle tone and nutrition as well as of the function of the heart and lungs.

We are still too apt to forget that the body as a whole suffers with the injury of the part, and that attention to these self-evident facts will do much to shorten convalescence and reduce the economic burden incidental to in-

validism. There is little danger of the patient overtaxing his strength during recumbency because he can interrupt the exercises at the slightest sign of fatigue and resume them after suitable rest periods.

It should be emphasized that every patient must be studied carefully and a physiotherapeutic program mapped out to meet individual requirements. The simple measures outlined above should be regarded as aids in the rehabilitation program.

#### Reference

1. Blount, W. P.: A New Hydrotherapy Tub, *J. Bone & Joint Surg.* 10:506 (July) 1928.

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## PHYSICAL THERAPY IN GENERAL SURGERY \*

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About thirteen years ago we were induced at the clinic to install some electrotherapeutic equipment. Though we had little if any knowledge of physical therapy, since that had not been taught us at that time in our curriculum, we were groping our way with what little information was provided by the sales representative. The demand for this type of treatment became so extensive that we were fortunate in securing the specialistic services of Dr. Elsom, to whom credit is due for having created a modernized department of physical therapy.

As the benefits of physical therapy to medicine and surgery became better appreciated more and more physicians and surgeons adapted its many uses to their particular needs. Among these was my brother James, who early recognized that its proper application was essential to the early restoration of normal function in all types of bone and joint lesions. Because he specializes in this subject, our department of physical therapy has come to be closely allied to his work, and he has consequently covered many phases of this question in his discussion this morning.

There are, however, other important subjects relating to physical therapy and general surgery which he has not attempted to discuss, that I will briefly mention. The practical application of this is just beginning to be appreciated by general surgeons and holds great promise for the future. Undoubtedly, future outstanding developments in medicine and surgery will be in the fields of chemistry and electricity.

#### Electrosurgery

In the limited time at my disposal I shall briefly discuss some of the surgical lesions that have been successfully treated by physical agents. I began with toxic goiter, because here we have attained with electrosurgery our most brilliant results.

I believe surgeons throughout the country have been slow to appreciate the possibilities electrosurgery offers to improve their results. Six years ago I was asked to speak on the relation of physical therapy to the treatment of goiter. At that time I stated that the subject was purely a negative one and that any treatment of toxic goiter other than by surgery was contraindicated. Developments in the electrical field have in this short space of time revolutionized our methods of treating hyperthyroidism.

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\* From the department of Surgery of the Jackson Clinic.  
\* Read at the Mid-Western Sectional meeting of the American Congress of Physical Therapy, Madison, March 12, 1935.

Surgery offers the best method of alleviating hyperthyroidism, and yet even at the largest clinics the incidence of recurrence has run all the way from 5 to 10 per cent. During the past few months I had occasion to review the end results of operation for exophthalmic goiter and I found that in a series of 437 cases which I had operated upon between 1922-1929, the incidence of recurrence was 5 per cent. These cases were all operated upon with the scalpel. In contrast to this series was a group of 200 cases operated upon electrosurgically during the past four years in which the incidence of recurrence has been reduced to 1.5 per cent. Even if it be argued that in the second group sufficient time has not elapsed to consider these patients cured, I am convinced that the results of thyroidectomy performed by electrosurgery are far superior to those obtained with the scalpel. In support of this contention the following points may be enumerated: (1) With electrosurgery it is possible to destroy the maximum amount of thyroid tissue with the minimum amount of danger to the important adjacent structures, such as the recurrent laryngeal nerves and the parathyroid glands; (2) the time factor is considerably reduced because coagulation is far quicker than ligation of the blood vessels; (3) the elimination of catgut ligatures decreases serum, lessens reaction, promotes healing and gives a better scar.

I still feel it essential to ligate the superior thyroid vessels and the lateral veins. It is not possible here to discuss the details of the technique used other than to say that a U-shaped mass of tissue is removed from each lobe with the cutting current leaving a wide lateral wall. The latter is grasped by small curved hemostats and elevated by traction or by the pressure of the index finger from below. Any remaining portion of tissue beyond a shell an eighth of an inch in thickness may then be removed by the electrosurgical loop. The blood vessels are next coagulated, and then the entire inner surface of the gland is slightly seared with the high frequency current. The lateral walls are approximated with a few interrupted sutures, the various layers united and the wound closed without drainage.

Among the queries regarding this method are those concerning possible injury of the trachea or the recurrent laryngeal nerves. It has been my good fortune so far to have avoided either of these accidents, and any ex-

perienced careful operator may avoid them. Early in my experience I had three cases of postoperative hemorrhage due to improper coagulation of vessels. None of these suffered any serious consequence, and experience together with a superior electrosurgical unit, has eliminated this complication.

Nowhere has electrosurgery proved more useful than in benign and malignant lesions of the oral cavity and accessory sinuses. In recent years I have found that cancerous growths in this region can be more simply and successfully treated with electrosurgery than with the scalpel, and I believe the results to be superior to those obtained with radium. I have successfully removed malignant growths of the eye lids and nose, cheek, lip, tongue, and mouth by electrosurgery. In leukoplakia with malignant degeneration, too, the rapid healing and soft pliable scars obtained have been a marked improvement over those secured by older methods.

In the removal of malignant growths about the neck, of parotid gland tumors, of deep seated cervical cysts, of tubercular glands, and the like, the coagulation of inaccessible small blood vessels is of inestimable value.

For the skin incision in malignant breast tumors and in thyroid surgery, however, I have discarded the cutting current in favor of the scalpel in order to obtain a more satisfactory scar.

The opening of abscesses by electrosurgery affords the simplest, safest and best procedure.

Time does not permit further discussion of the various other fields of surgery such as urology, gynecology and proctology where electrotherapeutics has come to play an important rôle. Occasionally even in abdominal surgery one finds this method to be superior to others. A few months ago I encountered a malignant growth of the gallbladder firmly adherent to the liver. By using the combined cutting and coagulating current it was possible to excise the growth with no loss of blood and at the same time seal off all lymphatics. Spreading ulcers are better treated with electrosurgery than by any other method. We have on the other hand not looked with particular favor on this method of removing diseased tonsils except in greatly debilitated or elderly persons.

#### Ultraviolet and Diathermy

One might easily devote the time allotted to a discussion of the other branches of physi-



cal therapeutics and their relation to general surgery. It is only possible to mention a few of the more important uses of ultraviolet light and diathermy. While the value of sunlight was known to the ancients, yet the scientific knowledge of its therapeutic possibilities was only realized in 1897. In that year Finsen suggested that specific rays of the sun, especially the ultraviolet, were effective in certain conditions, notably lupus vulgaris. In 1902, Bernhard treated a suppurative abdominal wound by sunlight with such success that many other wounds were thus treated. In 1903, Rollier founded his famous heliotherapeutic clinic, and Sir Henry Gauvain of England likewise opened his radiation clinic.

The work of these pioneers has opened up wonderful new fields for the surgeon to explore. The fact that the highest incidence of infected wounds comes following our long winter months of sunless skies, when the body resistance is at its lowest point, suggests the great importance of ultraviolet radiation in maintaining our health. I have found that the quickest "pick me up" after an operation is not the old fashioned tonic but a series of ultraviolet light treatments.

Many patients who have had to spend weeks in bed and would ordinarily return home pale, underweight and weak, now leave the hospital looking like their more fortunate neighbors who have been sojourning in Florida. The psychologic effect alone means a great deal in reducing the time of post-operative convalescence.

For the healing of draining sinuses, especially of tuberculous origin, ultraviolet has

proved invaluable in our clinic. Likewise, in the healing of wounds ultraviolet and infrared radiations have proved of great benefit. Particularly following goiter operations does the healing effect of light and heat tend to produce a desirable type of scar.

In recent years sacroiliac sprain has become extremely prevalent. No attempt has been made in this paper to deal with the subject of fractures and orthopedics because it has been so well covered by others, but I cannot help mentioning the invaluable aid diathermy has been in these fields. I personally am in a position to speak of the remarkable relief obtained for the pain and discomfort of sacroiliac sprain by diathermy.

### Conclusions

The relationship of general surgery and physical therapy is closely interwoven, that the success of the one often hinges on the accomplishment of the other.

General physical therapeutic as well as electrosurgical procedures if carried out along the lines advocated by the American Congress of Physical Therapy must necessarily soon become an integral part of general medicine and surgery.

### Bibliography

1. Granger, F. B.: *Physical Therapeutic Technic*, Philadelphia, W. B. Saunders, 1929, p. 114.
2. Jackson, Arnold: *Thyroidectomy Performed with the Radio Knife*, *Ann. Surg.* **93**:6, 1931.
3. Kelly, H. A., and Ward, Grant: *Electrosurgery*, Philadelphia, W. B. Saunders, 1932.
4. Stewart, H. E.: *Physiotherapy*, New York, Paul B. Hoeber, 1925.



## ELECTROCOAGULATION OF TONSILS \*

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The evolution of tonsil surgery dates back to 1900 when we used the tonsillotome, and later dissection and snare, followed by the Sluder operation, Meding enucleator, suction tubes, and other types of tonsil instruments. The most universally employed method is undoubtedly, dissection and snaring. Crow, of Johns Hopkins, does a dissection, followed with sutures. All of his patients are given a general anesthesia; in other words, it is considered a major operation.

The object of this paper is not to present extravagant claims or to consider electrocoagulation as a perfect method of tonsil removal. The general recognition given it, especially in the cases in which surgical tonsillectomy is contraindicated or refused, presents a fairly large field. The treatment has not been standardized. There is still much to do before the high frequency currents used in this work are standardized. However, research workers are devoting considerable time and effort to this purpose.

As to the method of choice between Tesla desiccation and d'Arsonval coagulation, authorities differ. Decision rests on the type of tonsil. The Tesla current is more easily controlled, is less penetrating and less concentrated than the d'Arsonval. Most of the operators prefer coagulation. The Tesla desiccation would ordinarily be indicated in the small and submerged type of tonsil and the d'Arsonval coagulation in the large or hypertrophied type.

To insure the best results, the high frequency apparatus must be kept in working condition at all times, with frequent attention to the spark gap, connections, and the best methods of insulation. The frequency of a 60-cycle current must be raised to a frequency of 10,000 per second, to render it safe. The frequency of a modern apparatus is several millions per second.

### Method

My experience consists in treating 500 cases by electrocoagulation during the period from 1922-1933. The age of the patients varied from 10 to 78. Only a small percentage of these patients were as young as 10 years and were treated by this method on account of contraindications to surgical tonsillectomy.

As to technic, nothing new can be presented. Nervous patients may be given some sedative prior to anesthesia such as nembutal in doses of  $1\frac{1}{2}$  to 3 grains, or sodium bromide in 15 to 30 grain doses at four hour intervals, or sodium amytal.

### Electrocoagulation

Topical applications are made of a 10 per cent solution of cocaine, about three in number, at intervals of a few minutes, or a 2 per cent solution of butyn, or anesthesin. When using butyn, I make from four to six applications to the tonsils, while anesthesin is used as a paste. Before beginning the operation, the apparatus is "shorted" at about 3,000 to 3,500 milliamperes, which with the patient interposed in the circuit, equals about 500 ma. The autocondensation handle may be used as one of the terminals; but, we prefer a block tin electrode to the back. For the past four years, I have been using the Doane electrodes with more satisfactory results.

With the Doane electrodes, less current is needed and it also appears to be less painful. There are various shaped electrodes to conform to the different types of tonsils. A curved-point wire needle electrode is inserted into the tonsil to a depth of about one-quarter of an inch, making from six to ten insertions for each tonsil. The appearance of the tissue indicates whether the dose is sufficient. A bakelite tongue depressor is used by many; but a metal tongue depressor is satisfactory. The number of treatments varies from two to six, four being about the average.

### Postoperative Care

The throat usually does not become very sore, but occasionally pain and edema may cause considerable distress. This is usually

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due to "touching up" of the pillars, which should be properly retracted at all times. Ice pack around throat, ice by mouth, and Dobell's or magnesium sulphate solution as a gargle are prescribed for pronounced soreness. The majority of patients have no bad after effects. Immediately after treatment, a 10 per cent solution of iodine in glycerine is used as a swab. Calcidin and anesthesin troches, allowed to dissolve slowly on the tongue, are given every two hours.

The advantages of this method are: The operation is practically painless, nearly bloodless, and hospitalization is unnecessary. The chief disadvantage is the fact that several treatments are usually required, making it inconvenient for patients living at a distance. It is, however, surprising how far they will come to avoid surgical tonsillectomy.

A patient who has had one or more treatments and finds his symptoms improved may consider himself recovered and fail to complete the course of treatments, but later experience trouble. Patients should be instructed to return at two week intervals until discharged. The percentage of patients not completing treatments is very small.

#### Case Reports

CASE 1. — A girl, aged 19, who always had infected tonsils, contracted diphtheria in 1929 (spring) and made a good recovery with the exception of neuritis involving the lower extremities. There was no paralysis, but on walking, she suffered much pain and was not able to walk up a flight of stairs. Two weeks after the first treatment she had recovered the use of her legs and has been well ever since she completed her treatments.

CASE 2. — A man, aged 78, suffered with chronic arthritis and was confined to his bed for several months. This man had focal infection of the teeth and tonsils, also a high blood pressure, mitral stenosis, and prostatitis. A nose and throat specialist refused to do a tonsillectomy and he was referred to me. Certainly no one would expect to obtain results in a case of this kind. His teeth were extracted, his tonsils coagulated, and dietary and medical treatment was prescribed. The patient, three years since this work was done, is reasonably well.

CASE 3. — A woman, aged 54, suffered a paralytic stroke, due to an embolism, and has auricular fibrillation. Her infected tonsils were coagulated

and she is being digitalized. Her condition is improved.

While electrocoagulation is described as a bloodless operation I have had three cases of hemorrhage postoperatively, one two weeks, another one week, the third, the day following treatment. The first two cases had had a surgical removal a year previously, but portions of the tonsils remained. These were desiccated and hemorrhage followed. In no case was the hemorrhage alarming.

Statistics of electrocoagulation are, as yet, in the formative stage, but reports from Clark, Plank, Dillinger, McFee, and Waring are encouraging. Physicians in France have employed this method for twenty years and practitioners in England have made use of the method for some time.

In the *Journal of the American Medical Association* for January 18, 1930, appears the following, from the *British Medical Journal*: "McKenzie is convinced that diathermy coagulation will come to be the method of choice for removing tonsils in adults. It is unsuitable for children."

As to surgical tonsillectomy, there appears in the same journal for October 20, 1928, an article by Paul S. Rhoads, and George F. Dick, on its efficacy for the removal of focal infection. They comment as follows:

The most frequent object in removing tonsils is to rid the body of tissue harboring bacteria capable of producing disease in other parts of the body. Yet it is shown that tonsillectomy as usually done, even in the hands of specialists of established reputation, fails to accomplish this end in 73 per cent of cases, because of incomplete removal of infected tonsillar tissue. There is even some indication that, in many cases, the condition resulting from incomplete tonsillectomy is worse than that existing before operation.

#### Conclusions

It is generally agreed that electrocoagulation is the method of choice, if surgical tonsillectomy is contraindicated or refused. This being the case, the field is a large one, Standardization of technic will eventually be accomplished. Following surgical tonsillectomy, if tonsillar tissue is retained, desiccation is the ideal procedure.

## FURTHER COMMENT ON ELECTROCOAGULATION OF TONSILS AND ADENOIDS \*

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BUTLER, PENNA.

The specific advantage of electrocoagulation over that of cutting methods is its relative safety. We do not claim the danger in coagulation to be nil, for that can not be said of any operation; but with experience and reasonable care, it is practically so. No fatalities or near fatalities have occurred in our own experience. We acknowledge with enduring regret one fatal case of postoperative hemorrhage after tonsillectomy in a child of eight, some eighteen or twenty years ago, also cases occasionally requiring ligation, or some other method for controlling secondary hemorrhage. In electrocoagulation, we have had to deal with secondary hemorrhage in about one-half of one per cent, with none for the last three years.

### Case Reports

About eighteen months ago, a clergyman sixty-seven years of age, consulted us about his throat. He had had one coagulation treatment to the right tonsil several weeks previously, two to the left. He had had two, one severe, hemorrhages from the right tonsil ten and thirteen years ago, respectively, after treatment. Evidently the doctor had tried to do all the work in one treatment, which we consider unwarranted and unsafe. There was some tonsil tissue, scar tissue, a "gouged out" appearance in both fossae, with a hole 2 or 3 mm. in diameter in each fossa extending into subtonsillar tissue. Creamy pus exuded from either on pressure in that region. We gave two treatments to each side, removing remains, carefully enlarging the rim of the cavities for better drainage, with no subsequent hemorrhage, cessation of pus discharge, and with gain in weight, strength, and morale of the patient. He was also relieved of some rheumatic manifestations. We controlled, by coagulation, secondary hemorrhage in a middle-aged woman, coagulated nine days previously in another state.

The worst report we have heard follows: Several years ago, a physician from the cen-

tral part of the state came to us to learn something of our technic. Said he, "What I am afraid of, is secondary hemorrhage. There have been two deaths from this cause in our part of the country." This was a matter of surprise to us, as we had previously heard of but one, and here there were other contributory causes and, we might add, we have heard of none since. In regard to the above mentioned fatalities, we harbor a suspicion that lack of proper training was at the bottom of the unhappy results.

In one of our cases of a bleeder where we had secondary hemorrhage, the bleeding came almost entirely from the plicas, which were interfering with vision and manipulation. The doctor, who kindly sent us the case, fearing to operate himself, failed to inform us of her hemorrhagic tendency. Both plicas were treated and there was free bleeding from both. However, this woman did not lose blood enough to prevent her from continuing household duties, but was weakened temporarily. Further treatments, avoiding plicas, gave no trouble. The only cases that have given us any trouble from hemorrhage have been women, although the female is supposed only to transmit, not be subject to, the hemorrhagic diathesis. Therefore, we have had no secondary hemorrhage from males known to be hemophiliacs, including one case who had bled about a pint from a hypodermic needle puncture in the tonsil. In this case, we gave six treatments to each tonsil, with none but happy results.

Six or seven years ago, a robust, middle-aged man, from another city, consulted us for electrosurgical removal of tonsils, saying he was sent by Dr. S. We said, "Are you a bleeder?" knowing Dr. S. to be a surgeon of some reputation who would ordinarily have removed the tonsils himself. He replied with some surprise that he was, and laughing, when we told him why we thought so, said, "Yes, the doctor was afraid to cut them out and sent me to you for the electric treatment."

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This case was disposed of without hemorrhage.

A man 57 came to us six years ago after a recent tonsillitis. He had had many attacks since a tonsillectomy years before. Some tonsil and much fibrous tissue, inseparable from the triangularis, was present. He was given several coagulation treatments and was free from trouble for five years. Last winter, following influenza, he was operated for frontal sinus infection and the surgeon convinced him tissue remaining in the tonsil fossae should come out. It was removed. Two severe hemorrhages ensued, which nearly cost him his life.

Two years ago, a girl of fifteen came to us for tonsil coagulation stating that she was a bleeder, her family bleeders, and that her brother had died from hemorrhage some years before after a tonsil operation. In consideration of this history, we treated only one tonsil at a sitting, giving seven treatments to each side and two to adenoids, with no postoperative hemorrhage, and little at time of treatment easily controlled by coagulation. The usual reason for getting a little hemorrhage during treatment is, that the patient suddenly gags or coughs, just as the current has been turned off and before the needle has been withdrawn. Thus by contracting the faucial muscles, the tonsil is thrown forward causing a deeper penetration of the needle than the part coagulated. It is only necessary to again introduce the needle as near the same place as possible, but a little deeper, and coagulate. One case of this kind, a stout, full-blooded physician with intensely congested tonsils, gave us some temporary trouble.

Perhaps we have unduly dwelt upon this subject of hemorrhage, but we consider it one of paramount importance in deciding the method of tonsil removal, as between tonsillectomy and coagulation. We might add that, with the exception of a case of acute tonsillitis, and one or two cases of quinsy and these occurring where there had been delay between treatments, we have recorded here practically all the bad effects known, but only a minor portion of those known or reported after tonsillectomy.

#### **Tonsil Remains and Regrowths**

No method that we have used, or are aware of, is entirely exempt from these undesirable occurrences, but with experience and care

there should be few of either class from any legitimate method. Naturally, we examine the tonsillar field in all ear, nose and throat cases that consult us, but we do the same in practically all eye cases, excepting those of foreign bodies, and sometimes omit it in refraction cases. It is the exception, rather than the rule, to find clean fossae and unimpaired palate and pillars in tonsillectomized cases, and this irrespective of whether the case had been operated in a country town or metropolitan city. Considering "mutilation of throat" under this heading also, perhaps we find more destruction of pillars than we do tonsil remains or regrowths. Now and then there is a "gouged-out" posterior pillar, or the uvula or other part of the palate gone. We have met with some eight or nine cases of impaired, or practically lost singing voice after tonsillectomy. We have heard of but one case after coagulation, and this not by a regular physician. There is no excuse for this. Among our own cases of singers coagulated, the only reports received have been of improved voices. The sins of coagulation are of omission, rather than commission. A great many extravagant claims are made by various writers for divers methods.

As to the comparative number of cases of remains or regrowths between tonsillectomized and coagulated cases, it is impossible to know, but we suspect the latter to be the majority. As to mutilation, there is no question as to preponderance in the former. It may be safely maintained, however, that there are too many of both.

Regrowths are probably remains that have taken on new growth. Here is a case, however, that we are unable to account for. Some eighteen years ago, a young lady came to us for tonsillectomy, which we did at the hospital by dissection and snare. A year or so later, she came for refraction. We took occasion to examine her throat. Her fossae, palate, and pillars were neat and clean. Several years later she came for a change of glasses and brought with her a nice little pair of regrowths. How do we account for it? We don't account for it. And we do not claim exemption from the rule that there will be an occasional partial return of an apparently completely coagulated tonsil, but to our knowledge, we have never had a complete or near complete return. One case simulated it, but proved to be an abscess in the triangu-



laris. We would like the consensus of opinion in regard to coagulation of this structure. Usually, we have not done so, as it leaves a more normal looking throat, more mucous membrane, and better support for the anterior pillar. Sometimes it is necessary to remove it, at least in part, to enable one to remove all tonsil tissue. This structure is often taken by the laity, sometimes by a physician, to be the tonsil. A lady said to us, "My doctor says my tonsils are coming back." This was a couple of years after coagulation. On examination, we found no signs of return. He had simply pressed down the tongue, without retracting the pillars, seen the plicas and concluded the tonsils were "returning."

Five or six years ago, an otolaryngologist came to us from a small city, bringing with him a young man. "Doctor," said he, "I want you to look at this young man's throat and see what sort of work I do. I coagulated his tonsils about a year ago." We looked and discovered what seemed to be about a quarter of a large tonsil, well up in the palatine fossa. It is without doubt, in some cases, difficult to know whether all tonsil tissue is coagulated, although the above case did not come under this head. There is this to say in regard to the two general methods of tonsil removal; if a small amount of tissue is left in the fossa, we believe it is less likely to grow, and certainly less likely to be infected, where the removal of tissue has been effected by heat.

#### End Results

With complete removal and without mutilation, there should be no material difference, although we do not get the retraction of pillars, with "wide open" appearance of throat, with coagulation, which now and then occurs after tonsillectomy. More immediate benefit may be expected to the child after tonsillectomy, more to the adult after coagulation. The reason? There is more fibrous tissue in the adult tonsil, relatively more loss of blood, and more postoperative pain and shock. Due to these things, his recovery is often slow, as they may for a considerable time offset the benefits otherwise to be derived from the tonsillectomy. After coagulation, the adult does not experience these deleterious effects, and not infrequently will derive real benefit from the first treatment, going right on to complete relief, if this is the only source of infection. Children, on the other hand, will usually soon

recover from a tonsillectomy and will then have the benefit of a purer blood supply, not having to wait over a period of weeks or months for a series of coagulation treatments, for we are now referring to those needing complete removal for infective symptoms.

#### Mutilation of Throat

This has already been referred to and, to some extent, discussed. We shall add but little. After coagulation, it is needless and should not occur, except in cases of malignancy. Occasionally, the plicas will need removing, at least in part, but the pillars and palate should be intact. The correlation of function of tongue, pillars, palate constrictors in mastication, deglutition, respiration, and phonation is among the most wonderful of the wonderful human body, and it does seem a shame that some of these structures are so often mutilated. No one will admit that the palate is not important. But the pillars are practically a part of the palate and they are attached to the tongue and superior constrictor of the pharynx, respectively, and their removal, which so often occurs in tonsillectomy, disturbs this delicate relationship, and function suffers. Perhaps the most regrettable of these dysfunctions, is loss of the singing voice, which now and then occurs. Recently a boy of thirteen came to us for hardness of hearing. A few weeks previously, he had had a tonsillectomy. Both anteriors were gone with a "chunk" out of the right posterior pillar. His speech seemed to be unnecessarily "thick" and indistinct.

#### Time Factor

There are pros and cons for each general method of tonsil removal, and it is up to the doctor, in a given case, to advise or decide. He should be equipped for either. If tonsillectomy is indicated, well and good, if coagulation, also good, but the particular method is to be selected. Here we present with confidence our "localized bi-terminal" method, as offering some points of advantage over others known to us. We believe it is safer than the plate method, for the current does not pass through the body, practically only through tonsil tissue, and a weak current suffices. The indifferent electrode is the pillar retractor, or a ring around the tonsil, so the current traverses only a fraction of an inch and the resistance is slight. We believe more delicate and accurate work can be done with the sin-

gle, than the bi-active needle, and that it is more easily and independently operated. Also, when much saliva is present, we would expect shorting of the current *on* instead of *in* the tonsil with the bi-active terminal. Seven years ago, we took up this idea of a bi-active terminal with a New York electrical engineer, but after personal discussion and some correspondence the idea was abandoned in favor of our present method.

We have space left but for a word about adenoid coagulation. The principle is identical with that of tonsil coagulation. The work is new and our experience limited. Our new "adenoscope" becomes the indifferent electrode, the needle, under direct vision, the active. After local anesthesia, the beak of the instrument is introduced under the soft palate and gradually passed upward and backward till the adenoid tissue comes into view. The head is held well back, and the patient requested to breathe through the nose, in order to relax the palate. A further application of the local anesthetic may be made direct to the adenoid tissue. A long needle, curved at the tip, is fixed into a bent handle, and introduced into the tissue to be coagulated. The current traverses the very short distance between the needle and the adjacent parts of the adenoscope. As much adenoid tissue may be coagulated as desired, with or without curettage. Before contacting the current, the tis-

sue near the base should be elevated a little away from the periosteum. Apparently this treatment is less painful, but more disagreeable than tonsil coagulation. There should be no shock and little or no after pain, because swallowing or other throat movements do not affect it.

### Conclusions

One doing tonsil work should be trained to do a clean tonsillectomy without encroachment on other structures, and a thorough electrocoagulation. In highly obstructive or infected cases of children a single radical operation is the method of choice. In older children and young adults, generally coagulation is proper, but if the tonsils are extremely large, requiring many treatments, this should be explained to the patient and let him decide. In practically all others, except time-limited, preferably perform coagulation. Safety is the prime factor in tonsil removal, and in favor of coagulation. Remains and regrowths are too common in both methods. Mutilation of the throat is much too frequent in tonsillectomy. End results should be practically the same in the two general methods. The adult will usually derive earlier benefit from coagulation. The localized bi-terminal method of tonsil coagulation has more points in its favor than others now in vogue. Coagulation of adenoids may be carried out in like manner, under direct vision.

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## "THE REACTION" IN ELECTROSURGICAL TONSILLECTOMY \*

(The Multiple Stage Operation)

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The field of electrosurgery in otolaryngology has become so broad and engrossing that it now promises to establish itself as a specialty within a specialty. The singular adaptability of the high frequency current to particular conditions in ear, nose and throat dis-

eases is now recognized by every experienced otolaryngologist.

The recent advance of electrosurgery augurs much for the future. As a new specialty in this age of specialization one may aptly refer to the erudite words of Morris Fishbein<sup>(1)</sup> in his last address to the section on Practice of Medicine at the Eighty-third An-

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\* Read at the Twelfth Annual Session of the American Congress of Physical Therapy, Chicago, September 12, 1933.

nual Session of the American Medical Association in New Orleans: "Thus the five physical senses of the old time practitioner have been prolonged, projected and intensified thousands if not millions of times. . . . Knowledge has accumulated so vastly that no longer is it within the compass of one man to learn and to apply all the knowledge or technical procedures that are available. The physician of an earlier day has evolved into the multiple specialties of the present. The specialties themselves have been divided and subdivided into technicalities beyond the comprehension of the average man. For example, the first of the divisions was the removal of diseases of the eye, ear, nose and throat into a specialty. Shortly thereafter, ophthalmology and otorhinolaryngology became separate specialties. Gradually a few otologists discontinued laryngology and rhinology and began to apply themselves largely to bronchoscopy and peroral endoscopy." Perhaps the complete parthenogenesis is now in sight as far as our specialty is concerned. The fission of electrosurgery from orthodox surgery is inevitable.

Clinical research in this virgin field is as yet in its infancy. The opportunity for investigation is almost endless. So profound is the knowledge to be elicited, that one is put in mind of the words of Edmund Prince Fowler<sup>(2)</sup> in his delightful and enlightening paper before the recent session of the American Medical Association. "The ultimate aim of all clinical research should be the prevention of disease, and in this field there are unlimited possibilities. Is the otolaryngologist particularly interested in prevention? It would seem not, if his methods of work are any criterion. In fact there have been known instances when, at least to all appearances, he seemed more interested in questionable operations: operations which should not be done unless clearly indicated to conserve health or life, operations that are apt to make the last state of the patient worse than the first. In addition to the obvious humanitarian, social and medical values of clinical research, there is its tremendously stimulating influence on all who participate in it directly or even indirectly. Its teaching value alone cannot be overestimated. The chief delight is not the mere discovery of facts but their application to the prevention, alleviation and cure of disease. There is no factor more potent for a professional life, be-

cause of real service rendered, than clinical research."

It has been apparent for some time that individuals responded with a marked degree of variation in intensity of reaction, both local and general, to the standardized electrosurgical extirpation of the tonsils. At first glance "an idiosyncrasy" of the individual was considered sufficient to account for this variation. Soon empirical observation was followed by scientific analysis and a definite cause for the peculiarities in response to surgical diathermy was discovered. Tonsil smears or throat cultures from one hundred patients were examined etiologically. The causative organism or the organism in preponderance was isolated.

Each individual case was then studied for the type of reaction following each electrosurgical treatment. Extreme caution was used to give each patient a standard, measured dose of current; six applications of the biterminal electrode as coagulation; four applications of the monoterminial electrode as desiccation, and three applications of the Oudin current to fulgurate the surface vessels and lymphatics. The patient was then given routine instructions during the weekly interim between treatments and asked to carefully note any reaction that might ensue. Emphasis was placed on the type of reaction, whether it was purely local or general. If general, whether it was grippelike in nature or accompanied merely by malaise and lassitude. The day upon which the peak of the reaction occurred was to be noted and also the length of duration. Each application was numbered and the reaction to each individual treatment noted.

Throughout, in the hundred cases used for experimental data, particular care was exercised to avoid not only the pillars but also the plica semilunaris and triangularis. Thus was avoided, as much as is humanly possible, the sensitive epithelialized structures which play an important rôle in the extent of pain noted by the patient. However, in all of this present analysis, pain was not the factor of importance other than the noting of its presence as a local reaction. Primarily here we are concerned with the general reaction which, as we shall see later, was pathognomonic of an invading virulent organism.

Many investigators have recently noted the effects of the end results of tonsillectomy in childhood and adolescence. The work of Kaiser<sup>(3)</sup> of Rochester, N. Y., lately corroborated

by Cunningham<sup>(4)</sup>, of California, and Glover and Wilson<sup>(5)</sup>, of London, stands out as a beacon to a more scientific interpretation of the effects of tonsillectomy and adenoidectomy. These authors' observations show that the condition of the tonsils is of minor influence on the health history and the determination of physical measurements; that the contention that normal tonsils are an aid in resisting disease is not strongly defended by contrasting the histories of disease of those with normal and those with pathologic tonsils; that the argument that the removal of tonsils closes the portal of entry for infections and respiratory diseases is not sustained by a comparative study of the histories of those who have had their tonsils removed and of those whose tonsils are present. The effect of the tonsils on the glands of internal secretion is suggested in the thyroid observations. The authors seem to be agreed on the indications for tonsillectomy in selected cases. They hold no brief for the retention of diseased or really obstructive tonsils or adenoids, nor do they wish to underestimate the value of the operation in cases in which there is evidence of toxic or obstructive damage. The effect of tonsillectomy on the occurrence and course of acute polyarthritis is recorded by Finland, Robey and Heinmann<sup>(6)</sup> in their analysis of the records of 654 consecutive cases. They found that previous tonsillectomy had no striking effect in reducing the incidence of cardiac lesions in this series of cases. Approximately one-half of the patients who were operated upon while apparently quiescent, showed evidence of activity following the operation, but in only six individuals were there serious complications. The average number of recurrences in the patients admitted following tonsillectomy was about the same as in those not previously operated upon. The attacks, however, were much closer together in those previously tonsillectomized. It becomes apparent then that simple removal of an infected focus is not sufficient to alleviate the symptoms or ameliorate the progress of any disease.

It has fallen to the observation of the essayist<sup>(7)</sup> in corroboration of the findings of McKenzie<sup>(8)</sup>, as later substantiated by Balmer<sup>(9)</sup> that after beginning the electrosurgical extirpation of tonsils in patients suffering from neuritis, myalgia, or arthritis, relief from pain may be quickly afforded. This relief of distal pain following the first few applications of

surgical diathermy to the infected tissue is responsible for the present investigation in a field which may prove most fertile in checking the ravages of the more virulent infecting organisms.

Theoretically, many factors may enter into the equation which may give the patient relief from symptoms. McKenzie suggested that sterilization of the focus in the tonsil is responsible. This may be refuted on the ground that pain is often relieved before total sterilization of the focus. Balmer offered the view that "diathermocryptectomy" by destruction of myriads of bacteria *in situ* produced a reaction in the individual analogous to an auto-genous vaccine reaction. There remains the possibility that there takes place a non-specific protein reaction simulating the response to typhoid vaccine or sterile milk injections. Further investigation into this problem reveals other interesting possibilities. In discussing local agents that increase tissue immunity in sinus mucosa, Fenton<sup>(10)</sup> emphasizes the action of the histiocyte or the so-called "reticulo-endothelial" cell capable of phagocytosis. Here we learn of the noninfectious factors which may influence nose and throat affections. Inflammatory changes, such as the exfoliation of epithelium, overgrowth of serous glands, and edema of the subepithelial tissue, are the signal for mobilization of numerous histiocytes and plasma cells<sup>(11)</sup>. Following these protective elements, which depend upon the type of irritant and duration of the irritative process, polymorphonuclear leucocytes and lymphocytes arrive in increased numbers while red cells may also be extravasated.

Combiesco<sup>(12)</sup> and his associates find that the treatment of tonsillar abscesses with anti-staphylococcus bacteriophage assures a rapid cure. As the results obtained by the authors with the staphylococcus bacteriophage were uniformly good irrespective of the bacterial flora of the pus, they conclude that these results cannot be due to any specific action of the lytic principle or from its exclusive action. Treatment of the abscesses with anti-staphylococcus or antistreptococcus filtrate prepared according to Besredka's method, as well as sterile peptone broth and physiologic saline solution gave uniformly the same results. As we have observed similar good results with diathermy, both medical and surgical, we are led to believe that the mechanism of the stim-



ulation of the defense elements of the organism is brought into action.

Dean<sup>(13)</sup> analyzing the laboratory investigations as aids in otolaryngologic diagnostics, puts us on our guard as to the extreme care necessary to differentiate, even by expert cytologic examinations, between the numerous blood diseases localizing in throat manifestations. Just as we must carefully differentiate between the ordinary lymphatic reactions and the monocytic anginas, such as myeloblastic leukemia and agranulocytosis, so must we cautiously learn to differentiate between the varied reactions due to the absorption of the end products of various organisms present in a diseased focus in the nose and throat.

#### Relation of Thyroid to Tonsils

For some time it has been noted that the average case of thyrotoxicosis is markedly improved after the removal of the tonsils. However, the opposite effect has recently been reported by experienced otolaryngologists. Bullwinkel<sup>(14)</sup>, in reporting two cases of tonsillectomy in thyroid disease, emphasizes the importance of first giving attention to the thyroid disease itself. One case which prior to operation gave a clinical picture of myxedema with a metabolism rate of minus 14, proved even more thyroidotoxic than the other where a metabolism rate of plus 30 was recorded. He concludes that it is certainly possible to precipitate an acute thyroid crisis by surgical procedures unless extreme care and thought are used. MacKenzie, of Bellevue Hospital, reported a fatal case of acute thyroiditis<sup>(15)</sup> which followed surgical tonsillectomy. This last winter I discussed a case represented at the New York Polyclinic Hospital, where an acute thyroiditis followed electrosurgical tonsillectomy. The presence of infection in the nasopharynx as an etiological factor was discussed. The importance of recognizing the relationship which exists between the thyroid and the tonsil was stressed. I noted that the removal of tonsils often became manifest in the clinical picture of hyperthyroidism and hypopituitarism. We are all familiar with the accumulation of flabby adipose tissue in the adolescent, particularly female, following tonsillectomy. In my own hands, electrosurgical tonsillectomy, practiced with meticulous caution towards complete extirpation of the tonsils, is indicated in the hyperthyroid individual. In the hypopituitary type I have advised

subtotal tonsillectomy or diathermocryptectomy, as the method of choice.

#### Newer Scope of Electrosurgery

It has been my privilege to observe Kernan<sup>(16)</sup> in treating primary carcinoma of the lung and bronchus by radon implantations and diathermy. (A new field is here presented to the electrosurgeon.) Five successful cases of carcinoma of the lung and bronchus are the only ones who have lived more than six months after a positive diagnosis was made. He infers from his observations that the disease carcinoma may not lie in the tumor which, histologically, is carcinoma. There must be some condition of the body metabolism that is the real disease of which the tumor is only the local manifestation. The experience of the author with primary carcinoma and lymphosarcoma of the tonsil has also been provocative of the question, whether complete local destruction of the evidence of a disease necessarily means the total eradication of that disease, especially as applied to cancer.

#### Types of Anesthesia

The problem of anesthesia is a most pertinent one in this field. For complete relaxation in bronchoscopy ether is still the safest anesthetic. However, with electrosurgery any combustible gas must be used with extreme caution. Local anesthesia with cocaine following preliminary avertin anesthesia is usually sufficient in the majority of cases. Gas oxygen has been proven dangerous at times when complete relaxation is attempted. Conductive anesthesia, as described by Maillard<sup>(17)</sup>, is most effective in electrosurgical tonsillectomy. Complete absence of pain is possible at the time of operation. However, the after-pain may be more intense when the operator inadvertently treats the innocuous and highly sensitive pillars and plical folds. For the average patient topical (10 minute) application of 2 per cent pantocain (Winthrop) to fauces and pharynx is sufficient for each electrosurgical treatment to each tonsil. I have found this preparation to be the most efficient for topical anesthesia.

#### Comment and Summary

Much confusion is still prevalent as to the reaction following each treatment of the tonsil electrosurgically during the course of total extirpation of the tonsils. An attempt is made to correlate the various types of reaction from

the bacteriologic viewpoint, in one hundred routine cases.

A systematic bacterial examination of each tonsil reveals a definite relationship between the more pronounced "grippal reaction" and the potency of the invading organism. Allowance being made for extraneous irritation, the amount of treatment at each sitting does not necessarily determine the degree of reac-

ment of the tonsil, connotes that a definite variation in the type of this reaction exists. That the reaction may be general as well as local in character is established. The general reaction is independent of the local response. A general reaction is rare after the fourth treatment to each tonsil, which is a manifestation of the sterilization of the focus of infection. The general reaction simulates re-

TABLE I.—*Analysis of the Autogenous Vaccine Reaction in One Hundred Electrosurgical Tonsillectomies \**

Preponderant Organism	Reaction After First Treatment	General Reaction Noted Up To	Peak of Reaction	End-Results Alleviation of Symptoms
Pos. 86; Neg. 14				
Hemolytic Strept. 25.7%	General and Local	Fourth Treatment	Fourth Day	Excellent
Non-Hemolytic Strept. 20.1%	General and Local	Third Treatment	Third Day	Very Good
Staphylococcic 30.9%	Local	Rarely Any	Second Day	Variable
Spir. Vincenti 4.6%	General and Local	Fourth Treatment	Fifth Day	Excellent
Diphtheroids 2.3%	General and Local	Third Treatment	Second Day	Very Good
Actinomycosis 3.4%	Chiefly Local	Fourth Treatment	First Day	Good
Miscellaneous Bact. 13.0%	Local	Third Treatment	Second Day	Variable

\* General reaction after fourth treatment is rare; focus being apparently eradicated.

tion to be expected. The potency of the invading organism is the decisive factor. The more virulent the invading organism the more pronounced the resultant local and general reactions. The greatest amount of general reaction is noted at the first two treatments. It is rare to note a general reaction after the fourth exposure to electrosurgery. Relief of distal pain, and stiffness, when present, follows shortly after the first few treatments.

#### Conclusions

This preliminary investigation of the problem of "reaction" after electrosurgical treat-

ment of the tonsil, connotes that a definite variation in the type of this reaction exists. That the reaction may be general as well as local in character is established. The general reaction is independent of the local response. A general reaction is rare after the fourth treatment to each tonsil, which is a manifestation of the sterilization of the focus of infection. The general reaction simulates re-

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#### References

1. Fishbein, Morris: Present Day Trends of Private Practice in the United States, J. A. M. A. 98:2039 (June 11) 1932.
2. Fowler, Edmund P.: Clinical Research in Otolaryngology, J. A. M. A. 98:185 (June 16) 1932.
3. Kaiser, A. D.: The Relation of Tonsils and Adenoids to Infections in Children, Am. J. Dis. Child. 41:568 (March) 1931.

4. Cunningham, Ruby L.: Normal Absent and Pathologic Tonsils in Young Woman, *Arch. Int. Med.* **49**:453 (March) 1932.

5. Glover, J. A., and Wilson, Joyce: End-Results of Tonsil and Adenoid Operations in Childhood and Adolescence, *Brit. Med. J.* **2**:506 (Sept. 3) 1932.

6. Finland, Maxwell; Robey, Wm. B., and Heinmann, Harry: The Effect of Tonsillectomy on the Occurrence and Course of Acute Polyarthritides, *Am. Heart J.* **8**:3 (Feb.) 1933.

7. Silvers, Lewis J.: Electrosurgical Extirpation of Tonsils. A Clinical Study of the Various Methods Employed with Their End-Results, *Arch. Otolaryng.* **12**:511 (Oct.) 1930.

8. McKenzie, Dan: Diathermy Medical and Surgical in Otolaryngology, New York, The Macmillan Company, 1930.

9. Balmer, Frederick B.: Electrosurgery and the Otolaryngologist, Including Gradual Extirpation of the Tonsils by Electrocoagulation and Diathermodryptectomy, *Arch. Otolaryng.*, **4**:15 (April) 1932.

10. Fenton, Ralph A.: Local Agents That Increase Tissue Immunity in Sinus Mucosa, *J. A. M. A.* **99**:2247 (Dec. 31) 1932.

11. Fenton, Ralph A.: Immunity in Otolaryngology, *Trans. Am. Laryng., Rhin. and Otol. Soc.*, 1931, p. 427. "Reticuloendethelial" Components of Accessory Sinus Mucosa, *Arch. Otolaryng.* **14**:586 (Nov.) 1931.

12. Combiesco, D.; Tretzu, I., and Popesco, M. S.: Mechanism of Action of Bacteriophage in Treatment of Tonsillar Phlegmons, *Presse Med. Paris* **40**:1386 (Sept.) 1932.

13. Dean, L. W.: Laboratory Investigations as Aids in Otolaryngologic Diagnoses, *J. A. M. A.* **99**:542 (Aug.) 1932.

14. Bullwinkel, A. G.: Tonsillectomy in the Presence of Thyroid Disease, New York S. J. Med. **33**:627 (May 15) 1933.

15. MacKenzie, Luther: Personal Communication to Dr. Bullwinkel in above Transactions.

16. Kernan, John D.: Carcinoma of the Lung and Bronchus; Treatment with Radon Implantations and Diathermy, *Arch. Otol.* **17**:457 (April) 1933.

17. Maillard, Edgar R.: Conductive Anesthesia for the Electrosurgical Removal of Tonsils, New York S. J. Med. **33**:527 (April 15) 1933.

Discussion of Papers by Drs. G. F. Zerzan, L. L. Doane, Lewis J. Silvers, Gregg A. Dillinger,\* and Frederick L. Wahrer †

Dr. R. A. Luongo (Philadelphia): Tonsillectomy is a very useful adjunct in otolaryngology, but it will never, to my belief, replace surgical enucleation. The fractional removal of tonsils with the electrocoagulating current is the method of choice. Surgical

enucleation is easier than electrocoagulation, therefore only experienced otolaryngologists (who also have had the necessary training) should use this method. The incomplete removal of tonsillar tissue, with subsequent return of symptoms, and indiscriminate applications by unskilled and untrained men, with subsequent mutilations and severe complications, have greatly contributed to the discredit and to the obstinate rejections of the method by leading otolaryngologists. Most of my colleagues in Philadelphia have seen or know of a man who has an internal carotid artery exposed and pulsating in his throat following electrocoagulation of tonsils. This is enough to discourage anybody and a priori to render the method condemnable. All the men that are using the method — including myself — claim that the operation is simple, painless, and bloodless, but everybody knows that severe reactions and hemorrhages have occurred following electrocoagulation. I have seen four cases of severe hemorrhages myself. Of course, this complication occurs only when unskilled and untrained men use the method. but it occurs and we ought to admit its possibility.

Incomplete removals, hemorrhages, mutilations, and the like also occur in surgical enucleation, and every otolaryngologist admits it; but I believe that these complications are perfectly avoidable by a skilled operator.

I have looked up the records of the Medico-Chirurgical, Polyclinic, Howard, and Graduate Hospitals of the past 17 years. In these hospitals an average of one hundred surgical tonsillectomies have been performed weekly. That makes a total of 88,400 cases.

Postoperative bleeding, which was easily controlled, occurred only in one-tenth of one per cent of the cases, and fatal bleeding occurred only in two cases of anomalies of the internal carotid arteries. These hospitals belong to the Graduate School of Medicine, University of Pennsylvania, and many operations were performed for teaching purpose. The two fatal cases were operated upon by two of the greatest authorities in otolaryngology. Pulmonary complications can be prevented if the anesthesia is not deep enough to eliminate the cough reflex (the watch dog of the lungs). I use electrocoagulation when the patients ask for it, when they fear surgery, when they cannot lose any time. when the tonsils are sclerotic and adherent, and for sterilization purposes in cases of grave illness. It is safer to use electrocoagulation in cases of diabetes, syphilis, tuberculosis, hypertension, bad hearts, old people. For tonsillar remnants electrocoagulation is the best procedure.

Dr. Edwin A. Griffin (Brooklyn, N. Y.): At one of the large Post Graduate Medical Schools of New York, there is held a weekly conference of the ear cases seen in the hospital during that week. The members of the staff are requested to ask questions or give constructive criticism, praise is absolutely tabooed.

\* Published elsewhere.

† Published in *Arch. Phys. Therap., X-Ray, Rad.* **15**:605 (Oct.) 1934.

This afternoon I think praise is in order to all these men from all parts of the country, who have given of their time and knowledge in the work done in electrocoagulation of the tonsil.

Dr. G. F. Zerzan has given us a very interesting, fair, concise and instructive paper on the technic of electrocoagulation of the tonsils. I most emphatically agree with Dr. Zerzan that the high frequency apparatus must be kept in perfect condition. The points must be cleaned regularly, the spark gap and connections inspected daily.

Regarding anesthesia, I do not see anything to be gained by using 2 per cent solution of butyn in conjunction with cocaine, butyn being more toxic than cocaine.

Dr. Zerzan speaks of his machine being "shorted" at about 3,000 to 3,500 milliamperes, I personally think this is too high, I regulate my own machine at about 1,800 to 2,000 milliamperes.

I have discontinued using the curved needle as the active electrode, employing in its place a straight needle through the entire office treatment. This needle is held fast in the holder and insulated to about  $\frac{3}{8}$  of an inch from its point by a rubber tubing. A straight needle can be placed accurately in the area of the tonsil which you wish to coagulate and does not tear or pull the tonsil. At the first treatment I insert this needle about  $\frac{1}{4}$  of an inch and lessen the depth of insertion at each subsequent treatment until I reach the capsule. I then engage a fine pointed forceps in the capsule and pull it toward the median line and then lay the needle on the surface. This forceps is not insulated. It is not necessary to use an insulated tongue depressor. With an uninsulated tongue depressor the operator will not give the patient any spark upon removing it and by chance touching the patient's chin.

I have found the average number of treatments to be about six, of course coagulating both tonsils at each visit.

Dr. Lewis J. Silvers has given us a great deal of scientific material for thought, consideration and research. I heard Dr. Silvers speak at Newark, New Jersey, about four or five years ago and I always wished to have the opportunity to thank him for one very important step in the technic of electrocoagulation of the tonsil, which he so clearly demonstrated. After coagulating he always disconnects the indifferent plate from the machine and places the active electrode in the Oudin current, and then desiccates and fulgurates the entire area of the tonsil, he has previously coagulated. This I have found to be a very important step to control secondary hemorrhage. It seals the blood vessels. Dr. Silvers' paper today has given us some interesting and instructive points. His explanation of the sudden relief of general systemic symptoms such as pain, stiffness, etc., after one or two treatments of the diseased tonsils is very unique. His theory of autogenous vaccine made by sterilizing the tonsillar area by diathermy is very instructive and I think it should be very carefully studied

in conjunction with the laboratory. We may shortly hear of the production of an autogenous vaccine in the human system in a few minutes by diathermy without waiting for long laboratory procedure. This will be something like Utopia, but miracles do sometimes happen. His proven viewpoint that the reaction, local and general, following diathermy depends upon the type of infection within the tonsil is very instructive.

Dr. G. A. Dillinger should be commended for his long fight to have surgical diathermy of the tonsils placed on a scientific basis. Concerning anesthesia, for the past year I have swabbed the area around and above the posterior tip of the middle turbinate with 2 per cent pantocaine solution (brand of tetracain) in each nostril. The Meckel ganglion or sphenopalatine ganglion is situated just outside the sphenopalatine foramen in the sphenomaxillary fossa. By hard rubbing with a swab this ganglion is anesthetized without injecting. I then swab the tonsils, pillars, palate, sides and base of tongue and cheeks with 2 per cent pantocain, repeating the foregoing method. In ten minutes and twenty minutes from the beginning of the anesthetic, anesthesia is complete. Pantocain is  $\frac{1}{10}$  as toxic as cocaine.

Prophylaxis is a much discussed topic, hence we should regard prophylaxis of hemorrhage. Let us ponder for a few minutes on the arterial supply of the tonsils. There are four arteries supplying the tonsil. The lingual, facial, *ascending pharyngeal* and *descending palatine* which is a branch of the internal maxillary. This is the largest artery and causes the most trouble. It is the only one which enters the upper part of the tonsil through the capsule just behind the anterior pillar. The other three enter the capsule in the lower half of the tonsil, hence I prevent secondary hemorrhage by coagulating and desiccating especially the inferior half of the tonsil at the junction of the tonsil with the anterior pillar during the first two treatments. This produces a thrombosis in these blood vessels and closes the blood supply to the tonsils, hence controlling bleeding and lessening the number of office treatments.

Of course, I have a nurse to retract the pillars and sponge away saliva and mucus. Atropin sulphate  $\frac{1}{150}$  of a grain is given to most of my patients one hour before operation as a control for saliva. A dry field is absolutely necessary for good results.

Infection following operation is caused by blocking of crypts. Therefore be careful to keep away from crypts especially during the first and second treatment. The crypta magna which is erroneously called the supratonsillar space, should be carefully inspected for infection, as it is very often covered by the plica semilunaris.

In the majority of cases I think it is good surgery to eliminate the plicae as they contain biogenetic lymphoid cells which are apt to regenerate. The capsule should be removed unless the patient is elderly. The removal of the capsule is the most difficult part of the operation.



**Dr. W. A. Gross** (Chicago): The results achieved by competent operators with electrocoagulation of tonsils are uniformly good. There can be no serious objection to the method when it is employed with efficiency. However, no method is 100 per cent perfect.

I find myself mostly in accord with what Dr. Dillinger has to say on the subject. His extensive experience in this field must necessarily place him as a recognized authority. I find adverse opinion is often based on a comparatively limited experience and such conclusion or opinion should not be entitled to the same recognition.

The basic principles must be observed in order to be successful, but individual observation and experience may result in modification of technic or equipment.

Cocaine solutions are used extensively for the purpose of anesthesia. I find that I can secure more complete and lasting anesthesia with 2 per cent nupercain solution. A thin film may be sprayed over the area at three to five minute intervals in three applications. This may be followed by topical applications of the same solution in extremely sensitive throats. I find the three spray applications are ordinarily sufficient.

Hemorrhage should be rare when proper precautions have been observed. Reinfection, while common to poor surgery, should not be a factor when sufficient treatment has been given. Many of the complications of surgical methods were due to the use of general anesthesia and have been largely eliminated in adults by the more general use of local injection anesthesia. I have had a number of patients who had scar tissue formation in the tonsil fossa, not the result of an incomplete tonsil removal, but due to cutting into the muscle tissue. This, even though in-extensive, may prove very annoying to the patients. All of them had complete relief by the application of surgical diathermy.

To the types of cases in which electrocoagulation is particularly indicated I would add diphtheria carriers and those who have been infected with trench mouth or Vincent's angina or streptococcus throat infection or all virulent organisms that may be carried in the tonsil. A small percentage of cases desires a partial removal or an eradication of only infected parts of the tonsil. It may also be used to advantage in infected tonsils during pregnancy.

Malformations that result from previous operative attempts are greatly improved with the application of surgical diathermy.

When all the favorable types of cases are enumerated I believe they will constitute considerably more than 10 per cent, as mentioned by Dr. Wahrer.

The time factor is the only objection of consequence in electrocoagulation of tonsils. This newer method when indicated is superior to surgery. Electrocoagulation should not be considered as merely another method of tonsil removal. I believe in the future it will be more commonly employed than surgery in adults. In children and

young adults I prefer surgical removal unless there are contraindications.

My practice has always been not to hurry the procedure or try to remove tonsils in only a few treatments. It usually requires about eight treatments at ten day intervals. If the tonsil removal is graduated in this method pain will be insignificant in the average case as pain and reaction are in direct ratio to the amount of tonsil coagulation attempted at each treatment. Atrophied tonsils are removed more readily than the hypertrophied kind.

If this method is so desirable in poor surgical risks why should it be undesirable in other cases? Complications will prevail in a percentage of surgical removals. We do not expect them or look forward to them. They are most common in adults. If diathermy is the thing to use in complicated cases, why then is it not logical to use it as an insurance against complications? No method should be too safe to use as a routine.

My preference happens to be for the single active electrode. Others may prefer to use the biactive electrode, which is used so successfully by Haiman of New York, or the method of Doane.

The electrode I use is bent to a 35 degree angle at its tip and is insulated by means of a rubber sleeve up to the point of insertion. I have the patient hold the tongue depressor.

When treating the right tonsil the patient holds the tongue depressor in position with the right hand and I hold the electrode in my right hand. My left hand is thus free to hold the pillar retractor. In treating the left tonsil the procedure is reversed. After bringing the electrode into position before the tonsil, the current is contacted by means of the foot switch. The needle thus coagulates its way into and out of the tonsil tissue. Consecutive insertions are made without breaking the current. This is not only time saving but gives the least possible disturbance to the tonsil tissue.

If there is considerable overlapping of plica I remove some in order to obtain an open fossa end-result.

I do not treat the slough surface. If pain follows a treatment it is usually relieved by Thant's lozenges, suphagen, or powdered aspirin applied to the base of the tongue, and ice bag if necessary. The work of Dr. Dillinger was largely responsible for my adoption of this method. I can well vouch for the fact that it is not an easily mastered technic. Extensive experience and good equipment are essential to good results. Results depend almost entirely on the skill of the operator. Many of those using the method are far from being qualified and their results prove the contention.

**Dr. Carl B. Sputh** (Indianapolis, Ind.): I want to take issue with both Dr. Dillinger and Dr. Doane when they say that the tonsils do not have to be removed before the age of ten in children. Many years ago I attended a dental convention, and they attributed the malformation of the mouth to hypertrophied tonsils and adenoids. At that and successive conventions I have

attended they advocated the removal of the tonsils and adenoids, particularly if they are obstructive, before the age of six.

I believe physiologists and pathologists have been searching for the function of tonsils in the human body, and to date I don't believe very many have found any specific use for tonsils and adenoids in children. Therefore I cannot see any objection to the removal of tonsils and adenoids in children early, particularly if they are obstructive or if they carry infection.

**Dr. M. Joseph Mandelbaum** (New York): I believe we have come to the time when we do not have to apologize for the use of diathermy in tonsillectomy. If we needed any reason we could not have a better one than the wide adoption by general surgeons of the use of this same means to remove all kinds of malignant growths.

I should like to present for your consideration an unproved theory, but one that is being considered by certain research workers as a cause of the secondary reaction, and that is the thermic liberation of bacteriotoxins. It is very similar to that which takes place during severe burns, surface burns. There are certain forms of bacteriotoxins that are not heat sensitive.

So why is it not possible, when heat is applied to the tonsillar tissues that are already infected by a variety of bacteriotoxins, that there is a liberation, in certain cases, of these most active and destructive toxins that cause an activation of the secondary infections? I am referring here to those not infrequent and very disturbing cases of exacerbation of cardiac and renal affections, and particularly the arthritides.

I believe that we have more or less of a standardization of electrocoagulation and diathermic treatment of tonsils. I think this is true not only of tonsil surgery but also of general surgery.

**Dr. G. F. Zerzan** (closing): I think one of the doctors who discussed the paper misunderstood me about the use of butyn. I think he stated that I used butyn in conjunction with cocaine. That is not correct. I use butyn independently. I never use butyn and cocaine on the same patient. I have been using butyn mainly in some children, from ten years and up; in fact, I have never used coagulation in children under ten. Of course, butyn is not nearly the anesthetic that cocaine is: I am afraid of cocaine. I use butyn more often than cocaine.

In those cases where I use a 10 per cent solution of cocaine, I try not to use any more than is absolutely necessary, and, of course, I never use it in children.

**Dr. Lewis J. Silvers** (closing): I have been particularly interested from the research standpoint in determining the reason for the clinical relief afforded patients by electrocoagulation of the infected focus where they may or may not respond to classic surgery. That is the problem that is peculiarly fascinating in this field of work. I want to know why it is that patients whose

tonsils I remove surgically are more apt to develop glandular dysfunction, or an exacerbation of a chronic infectious process. While those undergoing electrosurgery seem to definitely develop an immunity to their infection. From the evidence presented in the paper just read, you may reach the following conclusion: First, that the reaction to coagulation is not only local but also general in scope. The reaction is not alone that of a non-specific vaccine type, but apparently specific in nature. Alleviation of symptoms is afforded prior to total extirpation of focus of infection.

To avoid a severe general reaction during tonsil extirpation it is of paramount importance to destroy the virulent organism in the septic focus first by deep heat penetration. Subsequently the removal of the mass may then be accomplished with a minimum of the general grippe-like reaction.

**Dr. Gregg A. Dillinger** (closing): When we have definite symptoms that a child's tonsil is causing some trouble, take it out.

Just because we do not know the function of the tonsil is no excuse for a ruthless elimination of it. The best man in ear, nose and throat work in the world, I have worked with, believes that the tonsil has a decided, specific function, and he states what that function is. It would take too long for me to give it, but he believes that the tonsil is a laboratory making vaccines which go into the circulation and protect the child during its growth and development until it is sixteen years of age, against the toxins which are produced in the child's system from the same bacteria that are scattered through the head, nose, and throat.

**Dr. Frederick L. Wahrer** (closing): When you try to draw a definite line for the removal of tonsils according to age, I think you are making a very definite mistake. Either tonsils should be removed or they should not be removed. If a patient is having trouble, and you feel that that trouble is due to the tonsils and it cannot be removed until those tonsils are removed, then they should come out by some method or other, whether the patient be six months or sixty years old.

There has been considerable said about the method of anesthetizing tonsils for electrocoagulation. The anesthetic area seems to be spread any place from the sinuses, nose, nasopharynx, throat, trachea, and esophagus.

I don't see any reason for anesthetizing the cheek, tongue, pharynx, and the entire oral cavity, so to speak, in order to remove tonsils by electrocoagulation. Why spread all that cocaine or whatever you are using over the entire surface of the mucous membrane? Why not confine it to the area upon which you are going to operate? I believe that if you will confine the cocaine anesthesia to the tonsil area, you will get just as good anesthesia and will use less cocaine, which I feel is always advisable.

## FURTHER STUDIES WITH ZINC IONIZATION IN NASAL ALLERGY \*

A. R. Hollender, M.D., F.A.C.S.

CHICAGO

Sufficient clinical experience has been gained to date properly to evaluate zinc ionization of the nasal passages as a therapeutic measure. While there are many enthusiasts in favor of this method of treating certain types of nasal disease, it is a fact that there still prevails an indifference to its employment in definitely indicated cases. For this reason it is timely to present additional phases of this problem to further establish the therapeutic value of ionization on a scientific basis.

### Diagnostic Difficulties

It hardly needs emphasis that intelligent application of any remedy is possible only after the establishment of correct and complete diagnosis. So far as vasomotor rhinitis is concerned this is fraught with difficulties, which, however, are not insurmountable. Thus as I<sup>(1)</sup> have shown in a previous communication, it does not suffice to determine the underlying constitutional factors, for quite often the condition is masked by a coexisting sinusitis or other complications. Differentiation between infectious processes alone and those complicating a coexisting vasomotor rhinitis is facilitated by a study of the nasal secretions as suggested by Lindsay and Walsh<sup>(2)</sup>, and confirmed by other investigators. The presence of eosinophils in nasal secretions is conclusive for the diagnosis of vasomotor rhinitis. In the presence of a complicating infection the ratio of eosinophils to neutrophils is lowered, while in infections without coexisting vasomotor rhinitis the eosinophil count in the nasal secretions never exceeds one per cent.

Once a true vasomotor rhinitis is established it is essential to determine any irritants that create the allergic symptoms. It is an undisputed fact that so-called allergic attacks are brought about through the ingestion of offending substances and that the symptoms of coryza are less pronounced than the phenomena of a general reaction. Cooke<sup>(3)</sup> has stressed this fact and has formulated the view that in the non-seasonal type of allergic

nasal disease the absorption of inhaled airborne irritating substances is the underlying cause in nearly all instances.

Occasionally the diagnosis of true vasomotor rhinitis is rendered more difficult when more than one irritant is responsible. It is a common observation that in seasonal hay-fever, even after the advent of the first frost, the symptoms will not abate until effective treatment is instituted against each and every irritant. Again a persistent sinusitis frequently is the responsible factor in symptoms simulating vasomotor rhinitis, the resulting confusing picture disappearing only after its recognition and treatment.

### Specific Immunization

For the past few years there has been a growing tendency to treat both the seasonal and non-seasonal types of allergic nasal disease by so-called specific immunization. Theoretically the method is logical but in practice the results have not realized expectations. While from a scientific point of view every patient with vasomotor rhinitis should have a systematic allergic investigation, according to Feinberg<sup>(4)</sup>, the proportion in which such an investigation will yield negative results is high. Feinberg agrees that in those cases in which an allergic cause cannot be found it will be necessary to resort to other forms of treatment. Even where a positive result is obtained, Cooke<sup>(5)</sup> properly points out that the temporary effects of immunization necessitate its continuation for a prolonged period. The majority of rhinologists will no doubt share the view that at the present state of specific immunization therapy we are obliged to resort to other measures.

### Non-specific Therapy

In contrast with a number of reported cures of vasomotor rhinitis by non-specific forms of therapy, carefully made trials have left much to be desired. Various drugs have proved utter failures, epinephrine and its surrogates being merely palliatives and to be used as such only. Topical chemical applications

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(chromic acid, trichloroacetic acid, and the like) occasionally prove helpful for limited periods, which is ascribable to their cauterizing effects. Though Sajous<sup>(5)</sup>, Lloyd<sup>(6)</sup> and others have long ago broken a lance for cauterization of the allergic nose, it is a matter of experience that neither chemical nor actual cauterization has afforded permanent relief to say nothing of the destructive effects on the nasal mucosa. Surgical diathermy<sup>(7)</sup> represents an advance in that all the effects of cauterization can be accomplished without destruction of the nasal mucous membranes, but it also has not enhanced the therapeutic results.

#### Electrolytic Methods (Ionization)

Of late considerable clinical research has been accomplished with the effects of the galvanic current for its ability to produce electrolysis and ionization. These methods of treatment are not basically new for Leduc<sup>(8)</sup> many years ago drew attention to their indications in rhinologic practice. Certain workers have successfully carried out Leduc's suggestions, but the methods did not become popular until recently.

I have made extensive use of zinc ionization by a comparatively simple technic with results which justify its wider application in indicated conditions. It is essentially a procedure to incorporate zinc ions into the superficial layers of the nasal mucous membrane by a modification of electrolysis. The armamentarium consists of an apparatus yielding a smooth galvanic current, a zinc electrode connected with the positive pole of the battery, an electrolyte (a solution of zinc sulphate up to one per cent in strength), gauze packing, and a dispersive electrode to bring the patient into the circuit.

I have devised a special headband (Fig. 1) which permits the zinc electrode to be held firmly in place after it has been introduced into the nasal gauze pack saturated with the electrolyte. To complete the circuit the moistened dispersive electrode (attached to the negative pole of the battery) may be placed at the nape of the neck, forearm, or any other part of the body. The current is turned on gradually to comfortable tolerance (usually 10-15 milliamperes) for ten to fifteen minutes and is then gradually reduced to zero. This procedure can be carried out with the patient in either sitting (Fig. 1) or recumbent posture (Fig. 2). The method is safe and effective if the technic, the most important part of



Fig. 1. — Zinc ionization in sitting posture with self-retaining electrode in contact with wet packing in left nasal chamber.

which involves adequate packing of the nose and good electrical contacts, is properly carried out.

Without entering into a discussion of the several theories that have been advanced to explain the therapeutic effects of zinc ionization, histologic studies as well as clinical observation appear to leave no doubt that ionization ultimately produces an alterative effect on the nasal mucosa. This may be interpreted as a state in which the reactivity is changed from that of its initial sensitivity.

Objectively one notices that after ionization for vasomotor rhinitis the characteristic pallor of the nasal mucosa is modified in color in many patients. Where such a change does not take place after one treatment, it has been accepted by the writer as an indication to repeat the procedure after a reasonable period.

#### Histologic Effects

To correlate the histologic changes with the clinical results of nasal ionization many sections were studied with the following findings: Sections made immediately after treatment revealed changes in the surface epithelium ranging from thickening to partial destruction but with absence of cilia in every section. Sections taken at different periods after ionization showed gradual regeneration of surface epithelium, first as a squamous cell formation.



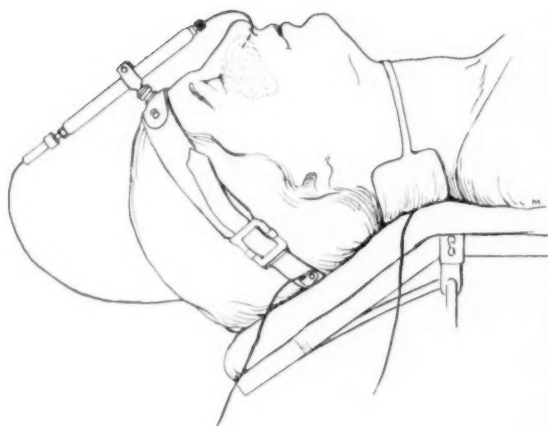


Fig. 2. — Nasal ionization treatment in recumbent position with self-retaining zinc electrode in contact with wet nasal packing in right nasal passage.

and at three months as a pseudostratified form, the cilia being consistently absent in all sections. The subepithelial stroma reveals a gradual tendency towards structural density with early marked lymphocytic reaction which subsides slowly but persists in a lesser degree for several years.

These histologic findings undoubtedly show that ionization produces an effect akin to fibrosis, which in all probability accounts for the reduced turgescence especially in the region of the inferior turbinate, followed by improved ventilation. The length of time during which lymphocytic reaction can be observed explains in part the prolonged palliative effect of ionization.

#### Clinical Observations

Zinc ionization was resorted to by me<sup>(9)</sup> at first as experimental therapy in vasomotor rhinitis after failures to afford many patients more than momentary relief by the usual methods. With the development of the technic and a certain individualism for special conditions, we have to date a total of 83 cases which have been followed up. More than 60 per cent responded promptly to the method. As a general rule the symptoms such as sneezing, rhinorrhea and impaired nasal breathing disappeared after the initial reaction subsided. Of the total number of patients treated, less than one-third required more than one ionization. The relief of symptoms has persisted for a long period, longer indeed than we have been able to obtain with any other method of treatment.

It should not be implied that palliation of symptoms is not attainable by other methods,

especially such which produce histologic changes similar to those of zinc ionization. But with regard to prolonged palliation the superiority of zinc ionization is already well established.

It is generally conceded that from an immunological and a pathological point of view, seasonal hay fever is virtually identical with the non-seasonal types of allergic nasal conditions. Theoretically, therefore, any method of treatment which is effective in the former should be equally effective in the latter. Experience has shown, however, that this is not the rule. With ionization our results in the past have not been as favorable in seasonal hay fever as those in vasomotor rhinitis (non-seasonal). Certain refinements of technic which have recently been developed promise to improve the effects. As these must of necessity be studied over periods during which the attacks are habitual, definite conclusions have been postponed.

#### Conclusions

1. Zinc ionization in non-seasonal types of nasal allergy is an effective and prolonged palliative.
2. Zinc ionization is not to be regarded as a panacea for allergic nasal conditions.
3. Intranasal zinc ionization is fundamentally an office procedure requiring no preliminary preparation and producing only a mild reaction for a brief period.
4. Results with the method depend upon correct application of technic in carefully selected cases.
5. The histologic picture of ionized nasal mucous membrane shows initial destructive changes with subsequent regeneration of the surface epithelium but with persistent absence of cilia.
6. While attempts are being made to correlate the histologic findings and the clinical results, no definite conclusions can as yet be drawn.
7. Studies appear to leave no doubt, however, that ionization ultimately produces an alterative effect on the nasal mucosa which may be interpreted as a state by which the reactivity is changed from that of its initial sensitivity.

#### References

1. Hollender, A. R.: Ionization as a Prolonged Palliative in Vasomotor Rhinitis, *Arch. Otolaryng.* **21**:448 (April) 1935.
2. Lindsay, J. R., and Walsh, T. E.: Nasal

Secretions: The Value of Cytologic Examination to the Rhinologist, *Arch. Otolaryng.* 17: 783 (June) 1933.

3. Cooke, Robert A.: In Cecil's Textbook of Medicine, Philadelphia, W. B. Saunders Company, 1930.

4. Feinberg, Samuel M.: Asthma, Hay Fever and Related Disorders, Philadelphia, Lea & Febiger, 1933.

5. Sajous, Charles E.: Hay Fever and Its Successful Treatment, Philadelphia, F. A. Davis & Co., 1885.

6. Lloyd, William: Hay Fever, Hay Asthma,

Its Causes, Diagnosis and Treatment, Chicago, W. T. Keener & Co., 1907.

7. Hollender, A. R.: Physical Measures in Hypertrophic Rhinitis, *Illinois, M. J.* 64:259 (Sept.) 1933.

8. Leduc, Stephane: Electric Ions and Their Use in Medicine (Translated by R. W. MacKenna), London, Rebman Limited, 1908.

9. Hollender, A. R.: Intranasal Ionization — Its Fundamental Aspects and Clinical Value, *Arch. Phys. Therap., X-Ray, Rad.* 15:581 (Oct.) 1934.

## THE STUDENT'S LIBRARY

**CLINICAL TUBERCULOSIS.** Edited by Benjamin Goldberg, M.D., F.A.C.P., F.A.P.H.A.; Associate Professor of Medicine, University of Illinois College of Medicine; Honorary Professor of Medicine, National University of Mexico; Formerly Director of the City of Chicago Municipal Tuberculosis Sanitarium. With the collaboration of 33 contributors. In Two Volumes. Fully illustrated with over 640 half-tone and line engravings and 9 full-page color plates. Over 800 pages, each volume. Cloth. Price, \$22.00. Philadelphia: F. A. Davis and Company, 1935.

The subject of tuberculosis never grows old and for this reason a work such as the one just published is both timely and valuable. It is presented in two volumes—comprehensive in scope—including chapters by specialists in every branch of medicine and surgery. While the editor acknowledges the fact that a specific remedy for tuberculosis is still lacking, he emphasizes that the present plan of management, which includes all the newer advances in surgical therapy, stands out as our most powerful weapon of attack. There are 48 chapters, the text material of which is well balanced in accordance with the importance of the subjects treated. The collaborators are outstanding authorities in their respective fields and they have injected into their contributions the results of vast experiences in dealing with the tuberculosis problem. One immediately takes cognizance of such chapters as the ones dealing with the newer biology of the tubercle bacillus, allergic and immunological considerations, prognosis in pulmonary tuberculosis, home treatment, artificial pneumothorax, intrapleural pneumolysis, phrenic neurectomy, and others too numerous to mention. Heliotherapy is presented in rational style by one who has had a life-long experience with this phase of management. The different surgical procedures are handled in such detailed fashion and so vividly illustrated that the steps in the technic can be carried out by any one who has had some experience in the surgical

handling of pulmonary lesions. The special chapters on extrapulmonary tuberculosis are informative, authoritative and individual in their relation of facts, many of which are based on the results of extensive clinical and laboratory investigations. In this group of subjects are included among others, meningitis, enterocolitis, anorectal tuberculosis, tuberculosis of the urogenital tract, tuberculosis of the ear, nose, accessory sinuses, pharynx and larynx, tuberculosis of the skin, etc., etc. The reader will appreciate the efforts which have been directed toward systematic diagnosis and therapy. It is apparent that this has been uppermost in the minds of the editor and his collaborators who fully recognize and emphasize the value of not only supervising the tuberculous involvement itself but also all possible coexisting conditions. In other words, the general hospital plan is stressed, a plan which provides every facility for a complete diagnosis and adequate therapy. The two volumes clearly demonstrate the editor's experience as a clinician and teacher in a field which is vast, embracing as it does every specialty in medicine and surgery. His personal close direction of the plan of this work has largely contributed to the coherent manner in which the entire subject is presented. The editor's administrative experience in the home, hospital and sanitarium programs of treatment is manifested in the chapters which he so admirably devotes to these vital problems. Too much praise cannot be said for the collaborative efforts. They show a type of co-operation seldom observed in a medical-literary contribution. The unique arrangement and numbering of the pages enables revision of any chapter without disturbing those preceding or following. The index is detailed and permits instant finding of any subject. The mechanical make-up of the book is far above the average. These volumes should be enthusiastically received by the medical profession. They contain information on the subject of tuberculosis which is not usually found in a single work. Every specialist should welcome this addition to his library

as it will prove of inestimable value for constant reference. For the general practitioner and for those who are brought more closely to the tuberculosis problem, Goldberg's *Clinical Tuberculosis* is an indispensable requisite containing as it does all that is new and worth while in the diagnosis and treatment of tuberculosis.

#### CORRECTIVE RHINOPLASTIC SURGERY.

By *Joseph Safian, M.D.*, Attending Plastic Surgeon, Sydenham, Beth David and Jewish Memorial Hospitals, New York. Illustrated by *Joseph Tamerin, M.D.* 242 Illustrations. Cloth, 218 pages. Price, \$9.00. New York: Paul B. Hoeber, Inc., 1935.

Rhinoplastic surgery has come prominently to the fore in recent years. Whether it received its impetus in the world war or in the changing times due to our present day living is merely a conjecture at best. The fact remains that public demand has been more responsible than any single factor in advancing our knowledge of an important branch of rhinologic surgery. As it stands today, refinements in technic and improvement in instruments have contributed greatly to the progress made. But more than these essentials the intense interest and application of certain workers in the specialty led to a scientific and systematic organization of available knowledge such as is exemplified in the present volume. The historical outline is of great interest and doubtless in itself a product of considerable investigation. To differentiate plastic surgery from other branches of surgery it is pointed out that plastic surgery is an art and a scientific method for correcting injuries and deformities of the human body. Restorative rhinoplasty was attempted at least one thousand years before the Christian era. The earliest accounts of rhinoplasty in Europe are those relating to the operations performed by Branca and his sons in Italy. The treatment of nasal defects is conveniently divided into corrective and restorative rhinoplasty. The former consists in the reconstruction of a deformed nasal framework to normal size and shape; the skin covering is usually intact and the defect consists in malposition and malformation of the bony and cartilaginous structures. Restorative rhinoplasty deals with the reconstruction of nasal defects wherein skin, as well as other structures, are deficient. For the rhinologist who from time to time is called upon to perform some type of plastic operation, a book such as this is of inestimable value. The technic of operation is adequately described and with the illustrations give a wealth of information. While experience doubtless is of prime importance, it is always well to know the classic procedure which on account of uniformity of successful results has received due recognition. The author's extensive experience is apparent throughout the volume. And where he has found occasion to do so, he has drawn liberally from the experience of other qualified surgeons. The need for the present work is especially noteworthy since only few systematic treatises are available, including those in other languages than English. Moreover, recent advances which have been made are recorded only

in the periodic literature. For quick reference and study a book containing the essential facts is extremely valuable. The reviewer has every reason to state that the author's knowledge of rhinoplastic surgery is obviously demonstrated by this extraordinary scientific presentation. This volume is recommended without reservation to every rhinologic surgeon as an indispensable addition to his library.

THE 1934 YEAR BOOK OF RADIOLOGY, DIAGNOSIS. Edited by *Charles A. Waters, M.D.* Roentgenologist, Johns Hopkins University and Hospital; and THERAPEUTICS. Edited by *Ira J. Kaplan, M.D.*, Director Division of Cancer, Department of Hospitals, City of New York. Cloth, Pp. 512, with illustrations. Price \$4.50. Chicago: The Year Book Publishers, Inc., 1934.

Few year books have enjoyed the deserved and continued popularity as that of the Radiology series. The scholarly, terse but cogent evaluations of contributions from every land and language have been so impressive as to have created a rare standard for others to emulate. Although smaller in content than previous years, the 1934 publication has maintained if not risen above the previous editions in the excellence of material presented. The seasoned team work of Waters and Kaplan is displayed in the selected abstracts and the appended editorial comments. The work as in previous volumes is divided into two main sections. The first deals with the diagnostic feature of radiology; the second with its therapeutics. In this edition diagnostics occupy the larger space but it must be pointed out that nothing is wanting in therapy that Kaplan has not included. He has pointed out the steady rise in the incidence of cancer in America. He has evaluated and very excellently too, the action of extra high voltage from the low voltage x-ray method in vogue and pointed out that it is of greater importance what the tumor absorbs than what penetrates through it. He has called attention to the unreliability of cancer tests, the growing importance of preoperative radiation in cancer of the breast, the value of small radium packs when persistently applied, the futility of acidotic treatment, and the increasing value of radiation in pelvic, neuritic and arthritic affections. The publishers are to be highly commended for supporting the continuation of this work and the excellence of type, paper and illustrations, this by no means a small venture in the face of difficult economic upheavals.

CHINESE MEDICINE. By *William R. Morse, M.D., LL.D., F.A.C.S.*, Dean of Medical School, Head of Department of Anatomy and Associate in Surgery, West China Union University, College of Medicine and Dentistry, Chengtu Szechwan Province, West China. No. 11, Clio Medica: A Series of Primers of History of Medicine. Edited by *E. B. Krumhaar, M.D.*, Cloth. Price \$2.50. Pp. 185 with illustrations. New York: Paul B. Hoeber, Inc., 1934.

This account of Chinese medicine is of particular interest to physiotherapists for the Chinese were originators of several physical methods of treat-

ment. The most interesting is that of acupuncture, which was apparently a Chinese discovery. It was employed even in the dim history of ancient China. Acupuncture consists in the introduction of hot or cold metal needles into the human body as a remedial agent. These needles may be of silver, gold, brass, copper, steel or iron. They may be either fine, coarse, short or long (3-24 cm.). It is of interest to note that in 1825 Bache a prominent physician of Philadelphia, published a book on this subject, and Sarlandière in the same year introduced electrical acupuncture for the treatment of gout and rheumatism. In China the whole history of medicine is on view. An excellent illustration of this statement and a vivid word picture is given by the author's two page description of a Chinese surgeon performing acupuncture in a market place. Alchemy was intimately associated with medicine from ancient times and is firmly believed in by the Chinese of today as a branch of Taoism. The Taoists recommend proper breathing, physical exercises and mental training as one method of gaining immortality. Physical exercises as a means of acquiring the vital essence were advocated by Lu Puh Wei about 237 B.C. The Chinese believe that he who can breathe expertly keeps away evil influences. Some peculiar ideas have prevailed, such as blowing on joints for rheumatism and for arthritis. Massage has been and is still used extensively in China, not as a medical practitioner's art but employed by the blind and the barbers. In the history of Pien Ch'iao, one of the Chinese gods of medicine, and most famous as an "internist," it is recorded that they healed diseases by pressing (massage) of the parts. This volume is full of interesting historical data on the use of physical agents and should be read by everyone interested in physical therapy.

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**PHYSIOLOGY OF MUSCULAR ACTIVITY.** By *Edward C. Schneider*, M. P. E., Ph.D., D.Sc., Professor of Biology at Wesleyan University, Middleton, Conn. Cloth, Pp. 401, with 27 illustrations. Price \$2.75. Philadelphia: W. B. Saunders Co., 1933.

The use of exercise as a therapeutic agent is an important part of physical therapy. In discussing the physiology of exercise the author points out that while the number of bodily variables are large during physical exertion, they are correlated to maintain the efficiency and stability of the bodily machine as a whole. The respiratory and circulatory systems have been described as the servants of the muscles and how the muscles control these two systems. The blood and the lymph provide the so-called "internal environment." This volume shows the importance of protecting the body from too great, too rapid or too irregular fluctuations in its internal

environment. The most important conditions to be maintained are the acid-base balance, the water content of the body, the blood temperature and viscosity, the oxygen and carbon dioxide pressures of the venous blood and the blood volume. This work includes a wealth of information of the greatest importance to the medical profession who are especially interested in physical therapy. An extensive bibliography is included.

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**PRAKTIKUM DER KLEINEN SPORTVERLETZUNGEN.** (Practical Care of Minor Sport Injuries.) By *Alexander Hartwich*, M.D., Late Assistant at the Orthopedic Hospital in Vienna. Carton. Pp. 130, with 23 illustrations. Price, 6 marks. Vienna: Wilhelm Maudrich (American Agency: Chicago Medical Book Co., Chicago.) 1935.

Considering the frequency of minor injuries produced in sports and athletics and their inadequate treatment in textbooks, this little manual decidedly fills a long felt need. The author has admirably succeeded in presenting their diagnosis and proper surgical, orthopedic, and physical therapeutic management in a number of very brief but adequate unnumbered chapters. He opens his subject with a discussion of the equipment of drugs, instruments, and dressings, and at once delves into a study of physical therapy. In this, massage plays an important rôle, as does mechanotherapy. The care of the skin during such treatment is pointed out. Radiating heat, diathermy, and electrical measures are critically reviewed. Baths are dismissed as of no special interest in minor injuries. Brief chapters on adhesive dressings, plaster-of-Paris bandaging, and orthopedic aids are treated rather generally. The clinical part is devoted to muscular pains, pains in the shoulder, contusions, tears of muscles and tendons, distortions of the knee joint, of the ankle joints, of the hands and fingers, and the like. Special chapters are devoted to the injuries of the lateral ligaments of the knee, while meniscal injuries are treated rather extensively. A specially interesting chapter is a brief study of the so-called Hoffa's disease, that is injuries to the fat body of the knee joint. Equally interesting is one on chondromalacia of the patella. The osteopathies of juvenile individuals, fractures with complete separation, and sport injuries of the periosteum are discussed with reference to the existing diversity of opinion on their nature and treatment. Post-traumatic ossification, wounds and excoriations, burns, and frostbite conclude the clinical part. The remainder of the book takes up statistical data, medical consultations, and prophylaxis. A large bibliography is presented at the end. There is no index, which would enhance the table of contents. This small book is all that could be desired for its restricted purpose.



# ARCHIVES of PHYSICAL THERAPY, X-RAY, RADIUM

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL THERAPY

Editor: DISRAELI KOBAK, M.D., CHICAGO

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## EDITORIALS

### DR. FRANZ NAGELSCHMIDT TO HEAD GROUP OF INSTRUCTORS FOR COURSE TO PRECEDE 14th ANNUAL SESSION IN KANSAS CITY IN SEPTEMBER

In the May issue of the ARCHIVES attention was directed to a course of instruction which is planned as an appropriate event to precede the fourteenth annual scientific and clinical session in Kansas City. The committee on arrangements is indeed very glad to announce the completion of the schedule which will be found in detailed form elsewhere in this issue. With the course extending over three days and the annual session over four days, a full week of intensive work in physical therapy is being offered. This should appeal especially to the busy practitioner and technician, who, while desirous of postgraduate study, are unable to leave their stations for long periods.

To head the group of prominent clinicians and teachers who have been selected with great care the committee has secured Dr. Franz Nagelschmidt, formerly of Berlin and more recently of London. Dr. Nagelschmidt needs no introduction to physical therapy workers. His pioneering efforts and contributions have gained for him international recognition. Dr. Nagelschmidt will bring numerous messages of scientific interest as

he has been engaged exclusively in research during the past few years.

In order to offer the utmost in a short course to those who enroll, it is necessary to limit the registration. For this reason early applications are solicited. The fees have been made merely to cover the expense of the course as the Congress has no desire to profit by it financially. Applications should be accompanied by a deposit of \$5 which will be applied to the charge of \$15 for members of the Congress, and \$20 for non-members and technicians.

Since the original announcement the committee has received numerous favorable comments on its efforts to bring this course to the profession. The enthusiasm thus far displayed and the numerous registrations which have already been made give every evidence that the project will be a most successful one.

It should be made clear that this instruction course in no way conflicts with the annual session. It is not necessary to attend the course in order to be eligible for attendance at the meeting. The course has been planned to precede the meeting merely as a matter of convenience.

Special arrangements have been made with the railroads for convention rates, but in order to secure a reduction in fares a *convention certificate* must be obtained when purchasing your transportation. From certain parts of

the country summer round trip rates are in force. These rates of travel are indeed very low and should influence you to come to Kansas City with your family to spend a most pleasant vacation. The hotel rates likewise have been specially reduced so that the total expense of a visit to Kansas City can be kept to a minimum.

Members are urged to interest their colleagues in these forthcoming gatherings. Rapid strides have been made with short wave, fever therapy, ionization, corrective exercise and other important subjects. In this course and in the annual session proper, im-



Dr. Franz Nagelschmidt

portant and valuable contributions will be offered which will keep you abreast of the times. Come to Kansas City and enjoy a combination vacation and study period. Remember the dates: September 5, 6, and 7, for the instruction course; September 9, 10, 11 and 12, for the fourteenth annual scientific and clinical session. For further information or for registration, address, *Chairman*, Program Committee, American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Illinois.

## ELECTROSURGICAL REMOVAL OF TONSILS

Electrosurgical removal of tonsils has many adherents while among laryngologists there are many who still continue to voice their unconditional opposition to this procedure. If that opposition were based on individual clinical experience, there would be some room for argument, but, unfortunately, the tendency to reject anything that is new and not officially sanctioned by accepted authorities without a hearing is too pronounced to go unchallenged.

There is no denying that the electrosurgical management of affections of the tonsils for which surgical tonsillectomy is indicated has not yet reached a final stage of development. But because of that and also of certain shortcomings a method should not be rejected in toto, especially not when clinical experience in competent hands has fully established its value in certain circumstances. The proper thing to do is to approach the problem without preconceived notions that have not undergone the crucible that separates the impure from the pure. Again occasional failures by individual operators under circumstances which have yielded excellent results in the hands of men experienced with the indications and technic of the procedure, should not be allowed to mitigate against any method of treatment without a thorough investigation, whether the fault is not ascribable to the individual operators rather than the method as such.

The fact stands out incontestably that electrocoagulation of tonsils by fractional extirpation has been successfully employed by a comparatively large number of men who have come to regard it as a substitute for surgical dissection or enucleation. No one can gainsay that classic surgery is not only not a panacea in tonsil disease but that its end results are not perfect. It is admittedly the most desirable routine procedure in the light of our present state of knowledge. But it must not be overlooked that in practice one encounters patients in whom surgery is either risky or otherwise inapplicable, in which case the choice of substitution rests between radium, x-rays, or electrocoagulation. There is no doubt that electrocoagulation has earned front rank as a substitute for surgery, its end results depending like with other operative methods upon individual skill and a carefully carried out technic.

The objective in any form of tonsillectomy

is the total removal of all lymphoid tissue, and there is no reason why this cannot be attained by electrocoagulation as by surgery. Hollender<sup>(1)</sup> has aptly pointed out that as this objective can be reached electrosurgically, provided one perseveres in the undertaking, the criterion of perfection rests on the determination when complete extirpation has been effected.

A factor which is not sufficiently taken into consideration in the electrosurgical treatment of an infected focus has been stressed by Silvers<sup>(2)</sup>, who has made a careful study of the problem. This author states: "It has been apparent for some time that patients responded with a marked degree of variation in the intensity of their reaction, both local and general, to the standardized electrosurgical treatment of each tonsil. At first it appeared cursorily that an idiosyncrasy of each patient was sufficient to account for this variation. Empirical observation, followed by systematic analysis, revealed a definite causative factor for the immunologic response to surgical diathermy."

The same author<sup>(3)</sup> concludes his discussion of the "immunity reaction" after electrosurgical treatment of the tonsil in these words: "A definite variation in the type of this reaction exists. The reaction may be general as well as local. The general reaction is independent of the local response. A general reaction is rare after the fourth treatment to each tonsil, which is a manifestation of the sterilization of the focus of infection. The general reaction simulates the response to inoculation of an autogenous vaccine made with a virulent organism. It is apparently specific. The occurrence of the relief from distal bodily pain and stiffness is independent of the total sterilization of the tonsil."

Accordingly it is clear that electrocoagulation possesses certain as yet undefined properties of which enthusiastic pioneers have failed to take cognizance perhaps because their interest was concentrated on the purely clinical aspects of electrocoagulation. Further research no doubt will reveal other factors of value in its clinical application.

Much of the early enthusiasm for electrosurgical tonsillectomy has waned, so that it is nowadays employed only by men who have become proficient to a degree of its full mastery. Not a few laryngologists restrict the employment of the procedure to the removal of

"stumps." There is no question that for lymphoid masses resulting from incomplete surgical tonsillectomy or hypertrophy of retained obscure remnants electrosurgical extirpation is ideal. And as it makes no difference for the effectiveness of the method whether the mass to be removed is small or large, one might properly ask why this method which is so ideal for the removal of tonsil "tags" should for that very reason not be equally effective for the removal of whole tonsils.

Logical as such reasoning is, it must nevertheless not be lost sight of that the method is not free from disadvantages, so far as tonsillectomy by fractional electrocoagulation is concerned. It is a time-consuming procedure which has in its trail some discomfort after each treatment. There is also a remote possibility of secondary hemorrhage. These in themselves, not serious disadvantages, have produced disfavor for the method especially among busy practitioners.

On the other hand one cannot underrate certain advantages which become especially valuable when routine surgical tonsillectomy is more or less definitely inapplicable, if not downright contraindicated. Under such circumstances we have, as already pointed out, an excellent substitute in electrosurgery.

That electrosurgery requires familiarity with its technical peculiarities which differ from those of classic tonsillectomy hardly needs more than mention. The same holds good with regard to its indications. It is as erroneous to adhere fanatically to it for all cases as it is to resort routinely to surgical tonsillectomy and allow no exceptions. The position to take in the light of accumulated clinical experience and scientific research is to free one's self from unjustifiable prejudices and evaluate electrosurgical methods in accordance with the results obtained by their correct and judicious application in practice. Condemnation of the method without restrictions is undoubtedly a graver error than its injudicious employment when classic methods should be the ones of choice. Sufficient time has elapsed since the advent of electrosurgery to justify its being given a fixed place in scientific laryngology.

#### References

1. Hollender, A. R.: Electrosurgical Tonsillectomy, *Arch. Phys. Therap., X-Ray, Rad.* **13**: 789 (Dec.) 1932.

2. Silvers, Lewis J.: Electrosurgery in Rhinology. A Solution for the Tonsil, Turbinate, and Sinus Problem, Arch. Phys. Therap., X-Ray, Rad. 13:154 (March) 1932.

3. —: The Immunologic Aspect of Electrosurgery in Rhinology, Arch. Otolaryng. 21:527 (May) 1935.

### PHYSICAL AGENTS IN SURGICAL DISEASES

The relation of physical therapy to surgery is being increasingly appreciated by surgeons of the highest skill and standing. Conscientious surgeons have long since protested against the *furor operativus*, the tendency to submit patients to even hazardous operations at the least indication. One must not overlook that there is such a thing as a group of so-called borderline diseases claimed by both internists and surgeons as their legitimate domain. When one considers the effectiveness of physical therapy in a vast number of affections, especially those of a more or less chronic character, one can catalogue the surgical affections in which properly employed physical measures may bring about results which render surgical intervention unnecessary.

A case in point, to mention one group, is that of various types of arthritis. Heretofore regarded as the legitimate field for surgeons, especially those interested in or limiting their practice to orthopedic surgery, it is a matter of everyday observation that surgical exposures of joints have been greatly restricted, because cooperation with qualified physical therapists has yielded superior end results than is attainable by resection, synovectomy or similar procedures. Again, where in many instances it was considered a triumph when a diseased process of large joints was arrested at the expense of an ankylosis, today physical therapy looks upon such an end result as a reproach rather than a desideratum for patients. Thus perseverance and intelligent therapy assure functional as well as anatomic cures.

The discovery of the remedial value of active and passive hyperemia has almost completely revolutionized the surgical management of virulent infections, especially of the extremities. Diathermy and ultrashort high frequency currents have eliminated the cumber-

some and poorly controlled heating appliances in vogue years ago, while passive hyperemia with its definite indications is still practiced with the simplest conceivable appliance and with a technic that is not difficult to learn. These and similar measures which we owe to the path-finding genius of the "physiologic" surgeon, August Bier, have been first advocated and practiced in this country by Blech, whose contributions unfortunately, like most other innovations deviating from orthodox teachings, have received the attention of only a few groups of progressive surgeons.

It was, therefore, extremely gratifying to those who were fortunate to attend the recent meeting of our mid-western section in Madison, Wisconsin, to listen to an earnest presentation on these topics by a surgeon of unquestionable ability, whose address appears in this issue.<sup>(1)</sup> Jackson stresses the advantages of the surgical treatment of goiter by means of the high frequency current, the details of which should be studied with care, for they are based on a large series of successful operations. Jackson brought out in the limited time available that other physical agents, long since advocated by the American Congress of Physical Therapy have proved of incalculable value in surgical diseases. His tribute to physical therapy as the friend and helper of classic surgery is concentrated into a few words — their relationship is closely interwoven, the success of one often hinging on the accomplishment of the other branch of medical science.

### Reference

1. Jackson, Arnold S.: Physical Therapy in General Surgery, Arch. Phys. Therap., X-Ray, Rad. 16:342 (June) 1935.

### Dr. Gustavus M. Blech Promoted to Brigadier General

It will please the many friends of our associate editor, Dr. Gustavus M. Blech to know that his works on medico-military and strategic subjects have earned him a commission as Brigadier General in the National Guard. General Blech, whose book on Medical Tactics we reviewed in the December, 1934, issue of this JOURNAL, has recently contributed a series of articles to American and foreign military journals which have been acclaimed as authoritative. We felicitate our colleague, whose efforts in the general surgical literature and military surgery have received wide recognition.



## SPRING SESSION

### Western Section of Congress and Pacific Physical Therapy Association

The Western Section of the American Congress of Physical Therapy and the Pacific Physical Therapy Association (endorsed by the Los Angeles County Medical Association) cordially invite all members of the regular profession and properly sponsored technicians to attend their annual meeting.

TIME — JUNE 27, 1935.

PLACE — Los Angeles County Medical Bldg., 1925 Wilshire Blvd., Los Angeles.

PROGRAM — Guest Speakers: Disraeli Kobak, M.D., Assistant Clinical Professor of Medicine (Physical Therapy) Rush Medical College of the University of Chicago, Chicago, Illinois; Editor, *Archives of Physical Therapy, X-Ray and Radium*.

George W. Walker, Fresno, California.

Section Chairman — Cleon W. Symonds, M.D.,  
Pasadena

10-10-10. Report on Activities of the Special Committee on Physical Therapy of the California Medical Association. John S. Hibben, M.D., Pasadena, Chairman.

10-10-10:30. Obliteration of Hemorrhoids by Galvanic Ionization. Disraeli Kobak, M.D., Chicago; Wilbur E. Keesey, M.D., Chicago.

10-30-11. Report on Progress of the Council of Medical Education of A. M. A. for the Approval of Schools of Physical Therapy and Registration of Physical Therapy Technicians. William W. Worster, M.D., San Gabriel; Disraeli Kobak, M.D., Chicago.

11-11:30. Iontophoresis of Histamin — David H. Kling, M.D., Los Angeles. Discussion — Disraeli Kobak, M.D., Chicago; George W. Walker, M.D., Fresno.

11-30-12. Malpractice Suits in Physical Therapy Practice. The Reason and the Remedy. Dewey C. Seeman, Los Angeles Medical Protective Company.

#### Afternoon Session

Section Chairman — Fred B. Moor, M.D.,  
Loma Linda, Calif.

2-2:30. History of Fever Therapy at Santa Barbara Cottage Hospital. Rodney F. Atsatt, M.D., Santa Barbara, California.

2:30-3. Elevation of Body Temperature by Simple, Safe and Efficient Conductive Method. Alan E. Gage, M.D., Los Angeles.

3-4. Evaluation of Hyperpyrexia Methods and Treatment. Disraeli Kobak, M.D., Chicago. Discussion: Rodney F. Atsatt, M.D., Santa Barbara; C. J. Breitwieser, E.E., California Institute of Technology.

4:20-4:40. Newer Technique in Colonic Therapy. Cora Smith King, M.D., Hollywood. Discussion: William W. Worster, M.D., San Gabriel.

4:40-5. What Price Antisepsis (Treatment of Wounds by Ultraviolet Light). E. B. Woolfan, M.D., Hollywood; Fred B. Moor, M.D., Loma Linda, Calif.

#### Evening Session — 7:00-10:00

Section Chairman — Cora Smith King, M.D.,  
Hollywood

7-10. Banquet — Toastmaster: Harry H. Wilson, M.D., President, Los Angeles County Medical Association.

1. Ionization Treatment of Hay Fever. George W. Walker, M.D., Fresno, California. Discussion — Disraeli Kobak, M.D., Chicago; H. J. Hara, M.D., Sc., D., F.A.C.S., Los Angeles; Robert W. Lamson, M.D., Los Angeles.

2. Radiathermy — Disraeli Kobak, M.D., Chicago. Discussion — David H. Kling, M.D., Hollywood; C. J. Breitwieser, E.E., California Institute of Technology; H. M. F. Behneman, M.D., San Francisco.

Address all Communications to:

Chairman Committee on Arrangements,  
John S. Hibben, M.D.,  
506 First Trust Bldg.,  
Pasadena, California.

Officers:

Western Section Congress P. T.

Cora Smith King, M.D., Chairman,  
Cleon W. Symonds, M.D., Secretary,

John S. Hibben, M.D., Program Chairman.

Registration fee \$3.00 including banquet ticket.

There will be scientific exhibits of all the latest physical therapy equipment.

# ANNOUNCEMENT

## *Preliminary Program*

### INTENSIVE INSTRUCTION COURSE IN PHYSICAL THERAPY

and

### 14th Annual Scientific and Clinical Session

### American Congress of Physical Therapy

#### INSTRUCTION COURSE — September 5, 6, 7, 1935

#### ANNUAL SESSION — September 9, 10, 11, 12, 1935

**Hotel Kansas Citian                      -:-                      Kansas City, Missouri**

This intensive short course covering every branch of physical therapeutics has been especially planned for the busy practitioner, but technicians and non-medical assistants are eligible to enroll. It will be held just prior to the 14th annual session of the Congress—making a full week of study available.

Lectures and demonstrations will be given by teachers and clinicians who have earned recognition by their outstanding work in the physical therapy science.

Every specialty in medicine and surgery will be represented and special forms of therapy will be discussed in detail.

The fee for the course is \$20 to non-members of the Congress and to technicians, and \$15 to members of the Congress in good standing. The sum of \$5 must accompany application for enrollment, balance to be paid by August 1, 1935. No registrations will be accepted after the required number of enrollments have been obtained. Application for enrollment may be made by letter or by filling in blank below.

#### APPLICATION FOR ENROLLMENT

**American Congress of Physical Therapy,  
30 North Michigan Avenue, Chicago, Illinois.**

I wish to apply for enrollment in course to be given by the Congress at Kansas City, September 5, 6, 7, 1935. Enclosed find remittance of \$5 to apply on fee, balance to be paid not later than August 1, 1935.

Name .....

Address..... City and State.....

Are you a member of the Congress?.....

Technician?..... Employed by whom?.....

#### HOTELS AND TRANSPORTATION

There will be no difficulty in securing hotel accommodations, but early reservations are essential. Write to the Executive Secretary, Marion G. Smith, 30 North Michigan Avenue, Chicago, or direct to the Hotel Kansas Citian.

#### Railroad Rates to Kansas City

Special rates have been granted for the benefit of members of the American Congress of Physical Therapy and dependent members of their families who will attend the annual session at Kansas City.

The Central, the New England, the Southeastern, the Southwestern, the Transcontinental, the Trunk Line and the

Western Passenger Associations, as well as the Eastern and Western Lines of the Canadian Passenger Association, have granted a rate of one and one-third fares.

To have the benefit of a return rate of one-third fare, it will be necessary for each member to secure a CERTIFICATE from the railroad ticket agent when he purchases his ticket to Kansas City. The certificate must be certified to by the Executive Secretary of the American Congress of Physical Therapy, which may be done at the Registration Bureau, to be located in the Convention Hall in the Hotel Kansas Citian, and must then be validated by a representative of the railroads. When the certificate is so certified and validated, it will entitle its holder to purchase a return ticket to his home, over the same route traveled to Kansas City, at one-third fare.

If the ticket agent at the member's home station does not have the certificate, he will furnish information as to where it may be obtained.

The certificate is not a receipt for money paid for a ticket, nor will a receipt entitle its holder to secure a return trip ticket at a reduced rate. Be sure to ask the ticket agent for a CERTIFICATE.

The dates of sale of tickets to Kansas City will be Sept. 2 to 10 in the territory of the Eastern Lines of the Canadian Passenger Association and in the territories of the Central Passenger Association, the New England Passenger Association, the Southeastern Passenger Association and the Trunk Line Association; from Arkansas, Kansas, Louisiana and Missouri, as well as Natchez, Miss., and Memphis, Tenn., in the territory of the Southwestern Passenger Association, and from Illinois, Iowa, Kansas, Manitoba, Minnesota, Missouri, Nebraska, northern Michigan and Wisconsin, as well as Julesburg, Colo., in the territories of the Transcontinental and Western Passenger Associations, and from Saskatchewan, Manitoba and Ontario (west of Port Arthur and Armstrong) in the territory of the Western Lines of the Canadian Passenger Association.

In the territories of the Southwestern, Transcontinental and Western Passenger Associations and of the Western Lines of the Canadian Passenger Association, the dates of sale of tickets from Alberta, Colorado (except Julesburg), North Dakota, South Dakota, Oklahoma, Texas and Wyoming will be Sept. 1-9; from Montana and southern Idaho, and from Arizona, British Columbia, California, Nevada, New Mexico, northern Idaho, Oregon, Utah and Washington, August 30 to Sept. 9.

Certificates properly certified and validated will be honored for purchasing tickets for the return journey at one-third fare up to and including September 16 (excepting Sunday, September 8). No refund of fare will be made on account of failure to present validated certificate when purchasing return ticket. The return ticket must be used over the same route as that traveled going to Kansas City.

When you purchase your ticket to Kansas City, secure from the railroad ticket agent a CERTIFICATE, which, when properly certified to and validated, will entitle you to purchase a return ticket to your home, over the same route traveled to Kansas City, at one-third the fare paid for your ticket to Kansas City.

BE SURE TO ASK YOUR RAILROAD TICKET AGENT FOR A CERTIFICATE WHEN PURCHASING YOUR TICKET TO KANSAS CITY.

#### Summer Excursion Fares

Summer excursion fares in the territories of the Transcontinental and Western Passenger Associations and of the Western Lines of the Canadian Passenger Association, which in some instances are on a lower basis than convention fares, will apply from some of the Western states, and members are urged to confer with their ticket agents as to which fare is lower—the special rate of one and one-third fares or the summer excursion fares.

#### Air Travel

Detailed information on any air or air-rail trip from any part of the United States to Kansas City will be gladly furnished by any United Air Lines ticket office or through its Chicago office at 400 South Michigan Avenue, or from any other air line ticket office, Postal Telegraph or Western Union office or travel bureau.

### LECTURERS FOR INSTRUCTION COURSE

September 5, 6, 7, 1935

under auspices of the  
AMERICAN CONGRESS OF  
PHYSICAL THERAPY

- T. S. BLAKESLEY, M.D., Staff, Trinity Lutheran, St. Luke's, Memorial, and General Hospitals, Kansas City, Missouri.
- HOWARD A. CARTER, B.S. in M.E., Secretary, Council on Physical Therapy, American Medical Association, Chicago.
- WILLIAM L. CLARK, M.D., President, American Congress of Physical Therapy, Philadelphia, Pennsylvania.
- JOHN STANLEY COULTER, M.D., Associate Professor of Physical Therapy, Northwestern University Medical School; Member, Council on Physical Therapy, American Medical Association, Chicago.
- JOHN D. CURENCE, M.D., Instructor in Medicine, College of Physicians and Surgeons, Columbia University, New York.
- F. H. EWERHARDT, M.D., Assistant Professor of Physical Therapeutics, Washington University School of Medicine, St. Louis, Missouri.
- A. R. HOLLENDER, M.D., Instructor in Laryngology, Rhinology and Otology, University of Illinois College of Medicine, Chicago.
- WILBUR E. KEESEY, M.D., Staff, Illinois Masonic and John B. Murphy Hospitals, Chicago.
- DAVID H. KLING, M.D., Assistant Professor of Orthopedics, College of Medical Evangelists, Loma Linda, California; Director of Arthritis Department, Cedars of Lebanon Hospital, Los Angeles, California.
- DISRAELI KOBAK, M.D., Assistant Clinical Professor of Medicine (Physical Therapy) Rush Medical College of the University of Chicago, Chicago.
- GUSTAV KOLISCHER, M.D., Senior Urologist, Michael Reese and Mount Sinai Hospitals, Chicago.
- A. J. KOTKIS, M.D., Senior Instructor, Internal Medicine, St. Louis University School of Medicine; Chairman, State Committee on Physical Therapy to the Missouri State Medical Association, St. Louis, Missouri.
- JOHN L. MYERS, M.D., Associate Professor of Otorhinolaryngology, The School of Medicine, The University of Kansas, Kansas, Kansas City, Missouri.
- FRANZ NAGELSCHMIDT, M.D. Formerly of Berlin, Germany, now of London, England.
- NATHAN H. POLMER, M.D., Assistant Professor of Clinical Medicine, Graduate School of Medicine, Tulane University of Louisiana, New Orleans, Louisiana.
- C. I. REED, Ph.D., Assistant Professor of Physiology, University of Illinois College of Medicine, Chicago.
- WILLIAM H. SCHMIDT, M.D., Associate in Physical Therapy, Jefferson Medical College, Philadelphia, Pennsylvania.
- ALBERT F. TYLER, M.D., Formerly Clinical Professor of Roentgenology and Physical Therapy, Creighton University School of Medicine, Omaha, Nebraska.
- A. DAVID WILLMOTH, M.D., Senior Surgeon, St. Anthony's Hospital, Louisville, Kentucky.
- JAMES W. WILTSIE, M. D., Binghamton, New York.

### INSTRUCTION COURSE

First Day

THURSDAY, September 5, 1935

#### HOTEL KANSAS CITIAN

- 9:00 to 9:45 A.M. An Introduction to Physical Therapy.  
DR. FRANZ NAGELSCHMIDT.
- 9:50 to 10:30 A.M. Medical Diathermy — Physics, Indications — Technic.  
DR. FRANZ NAGELSCHMIDT.
- 10:35 to 11:15 A.M. Short Wave Diathermy.  
DR. DISRAELI KOBAK.
- 11:20 to 12:00 Noon. Diathermy in Rhinology and Laryngology.  
DR. JOHN L. MYERS.
- 12:00 to 1:50 P.M. LUNCHEON — Round Table Discussion:  
Diathermy —  
DR. FRANZ NAGELSCHMIDT.
- Short Wave Therapy —  
DR. DISRAELI KOBAK.
- 2:00 to 2:45 P.M. Ultraviolet Irradiation — Physics — Indications — Technic.  
DR. FRANZ NAGELSCHMIDT.
- 2:50 to 3:30 P.M. Irradiation of Foods, Drugs and Other Substances.  
DR. C. I. REED.
- 3:35 to 4:15 P.M. Physical Therapy in Proctology.  
DR. WILBUR E. KEESEY.
- 4:20 to 5:00 P.M. X-Ray and Radium Therapy: Fundamentals, Indications and Methods of Application.  
DR. ALBERT F. TYLER.
- 5:05 to 5:45 P.M. Treatment of "Neuralgias".  
DR. DISRAELI KOBAK.

### INSTRUCTION COURSE

Second Day

FRIDAY, September 6, 1935

#### HOTEL KANSAS CITIAN

- 9:00 to 9:45 A.M. Short Wave Diathermy.  
DR. FRANZ NAGELSCHMIDT.
- 9:50 to 10:30 A.M. Fever Therapy.  
DR. WILLIAM H. SCHMIDT.
- 10:35 to 11:15 A.M. Physical Therapy in Gynecology.  
DR. A. DAVID WILLMOTH.
- 11:20 to 12:00 Noon. Colonic Therapy.  
DR. JAMES W. WILTSIE.
- 12:00 to 1:50 P.M. LUNCHEON — Round Table Discussion:  
Fever Therapy —  
DR. WILLIAM A. SCHMIDT.
- Physical Therapy in Gynecology —  
DR. A. DAVID WILLMOTH.
- 2:00 to 2:45 P.M. Ultraviolet Irradiation in Relation to Deficiency Diseases.  
DR. C. I. REED.
- 2:50 to 3:30 P.M. Electrodiagnosis.  
DR. FRANZ NAGELSCHMIDT.
- 3:35 to 4:15 P.M. Physical Measures in Subdeltoid Bursitis.  
DR. NATHAN H. POLMER.
- 4:20 to 5:00 P.M. Physical Therapy in Otolaryngology.  
DR. T. S. BLAKESLEY.
- 5:00 to 5:45 P.M. Ionization in Rhinology and Otology.  
DR. A. R. HOLLENDER.

### INSTRUCTION COURSE

Third Day

SATURDAY, September 7, 1935

**HOTEL KANSAS CITIAN**

- 9:00 to 9:45 A.M. Hydrotherapy and Massage.  
DR. JOHN D. CURRENCE.
- 9:50 to 10:30 A.M. Low Voltage Currents; Discussion of Concepts, Units and Energy Transformations.  
MR. HOWARD A. CARTER.
- 10:35 to 11:15 A.M. Electrosurgery.  
DR. WILLIAM L. CLARK.
- 11:20 to 12:00 Noon. Corrective Exercise and Massage.  
DR. F. H. EWERHARDT.
- 12:00 to 1:50 P.M. LUNCHEON — Round Table Discussion. Work of the Council on Physical Therapy, American Medical Association.  
DR. JOHN S. COULTER, and  
MR. HOWARD A. CARTER.
- 2:00 to 2:45 P.M. Arthritis.  
DR. JOHN S. COULTER.
- 2:50 to 3:30 P.M. Physical Therapy in Urology.  
DR. GUSTAV KOLISCHER.
- 3:35 to 4:15 P.M. Short Wave Diathermy.  
DR. DAVID H. KLING.
- 4:20 to 5:00 P.M. Infrared and Ultraviolet Irradiation.  
DR. A. J. KOTKIS.
- 5:05 to 5:45 P.M. Low Voltage Currents: Clinical Application.  
DR. FRANZ NAGELSCHMIDT.

**RULES GOVERNING THE READING OF PAPERS AND DISCUSSIONS**

No address or paper before the Congress shall occupy more than twenty minutes in its delivery and no member shall speak more than five minutes or more than one time on any one subject, provided, each essayist be allowed three minutes in which to close the discussion. This rule must be strictly adhered to.

All papers read before the Congress shall be the property of the Congress for publication in the official journal. Each paper shall be deposited with the Secretary when read.

No paper shall be published except upon recommendation of the Publication Committee, which shall consist of the Editor as Chairman and other duly appointed members of the Congress.

**GENERAL INFORMATION**

The instruction course will be held on Thursday, Friday and Saturday, September 5, 6, and 7; the fourteenth annual session will follow on Monday, Tuesday, Wednesday and Thursday, September 9, 10, 11 and 12, 1935.

**FORMAL OPENING OF CONGRESS**

While the 14th annual session officially opens for registration and other activities on Monday morning, September 9, the formal opening will not take place until the evening of that day. After the addresses of welcome and the induction of the president-elect, the *THIRD ANNUAL WILLIAM BENHAM SNOW MEMORIAL LECTURE* will be given by Arthur Steindler, M.D., of Iowa City, Iowa, on *Physical Properties of Bone*.

**REGISTRATION**

Everyone attending the sessions should register before entering the Convention Hall or any of its quarters. Those not registered will be excluded from the halls. Physicians and technicians who have taken the course of instruction should formally register before attending the annual session.

**BUSINESS MEETINGS**

The business meetings will be held on Monday, September 9, at 11 o'clock, and on Thursday, September 12, at 2 o'clock. These meetings will be held in the Convention Hall, 21st floor. All members of the Congress are urged to attend as numerous matters of importance will be presented for consideration. The Committee on Nominations will be appointed at the opening business meeting.

**SCIENTIFIC EXHIBITS**

The Scientific Exhibits should prove of great interest. They will be found in the Exhibit Hall on the 21st floor. As was the practice last year, medals will be awarded to those exhibits which are adjudged the outstanding ones by a committee of three judges in addition to the Committee on Scientific Exhibits. The three judges shall not be members of the Congress.

**EDUCATIONAL CONFERENCE**

Practically an entire afternoon has been set aside for the educational conference to be held on Thursday, September 12, at 3 o'clock. Technicians are especially invited to attend this conference. Those engaged in undergraduate or postgraduate teaching will find this conference of great value. In fact technicians and clinicians are urged to present their problems for discussion.

**TECHNICAL EXHIBITS**

The commercial exhibits have been selected with a great deal of care. The manufacturers and dealers are outstanding in their fields. They will display the newest developments in lamps, high-frequency machines, short wave apparatus, low-wave current machines, static, x-ray, oxygen and electrosurgical units. Fellows and guests are urged to make frequent inspection tours of the exhibits during the periods indicated on the program for this purpose.

**GENERAL JOINT SESSIONS**

General Joint Sessions are represented in the arrangement of this year's program and the papers are numbered to indicate the days on which they will be read according to the following plan:

- 101-106 Monday Afternoon.  
201-207 Tuesday Afternoon.  
301-306 Wednesday Afternoon.  
401-406 Thursday Morning.

**SCHEDULE OF DAILY ACTIVITIES****14th Annual Session****MONDAY, September 9**

- 8 A.M. Registration and Inspection of Exhibits.  
9 to 11 A.M. Examination of Technicians.  
11 to 12 Noon. **FIRST BUSINESS SESSION** — Convention Hall, 21st floor.  
12 to 2 P.M. Luncheon and Inspection of Exhibits.  
2 to 5 P.M. **GENERAL SCIENTIFIC SESSION** — Convention Hall.  
5 to 6 P.M. Inspection of Exhibits.  
6 to 8 P.M. Dinner and Inspection of Exhibits.  
8 to 10:30 P.M. Formal Opening of Congress — Convention Hall — 21st floor.

**TUESDAY, September 10**

- 8 A.M. Inspection of Exhibits.  
9 to 12 Noon. Clinical Conferences in Sections.  
(a) **MEDICAL SECTION** — Private Dining Room E — 5th floor.  
(b) **SURGICAL SECTION** — Reception Room — 5th floor.  
(c) **EENT SECTION** — Private Dining Rooms A and B — 5th floor.  
(d) **COLONIC THERAPY** — Convention Hall — 21st floor.  
12 to 2 P.M. Luncheon and Inspection of Exhibits.  
2 to 5 P.M. **GENERAL SCIENTIFIC SESSION** — Convention Hall — 21st floor.  
5 to 6 P.M. Inspection of Exhibits.  
6 to 8 P.M. Dinner and Inspection of Exhibits.  
8 to 10:30 P.M. **JOINT MEETING WITH JACKSON COUNTY MEDICAL SOCIETY** — Convention Hall — 21st floor.

**WEDNESDAY, September 11**

- 8 A.M. Inspection of Exhibits.  
9 to 12 Noon. Clinical Conferences in Sections.  
(a) **MEDICAL SECTION** — Private Dining Room E — 5th floor.  
(b) **SURGICAL SECTION** — Reception Room — 5th floor.  
(c) **EENT SECTION** — Private Dining Rooms A and B — 5th floor.  
(d) **COLONIC THERAPY** — Convention Hall — 21st floor.  
12 to 2 P.M. Luncheon and Inspection of Exhibits.  
2 to 5 P.M. General Scientific Session — Convention Hall, 21st floor.  
6:30 to 10 P.M. Annual Congress Dinner, Informal, Convention Hall — 21st floor.



**THURSDAY, September 12**

- 8 A.M. Inspection of Exhibits.  
 9 to 12 Noon. GENERAL SCIENTIFIC SESSION — Convention Hall, 21st floor.  
 12 to 2 P.M. Luncheon and Inspection of Exhibits.  
 2 to 3 P.M. FINAL BUSINESS SESSION — Convention Hall — 21st floor.  
 3 to 5 P.M. EDUCATIONAL CONFERENCE — Convention Hall — 21st floor.

**FORMAL OPENING OF CONGRESS****Monday, September 9, 8 P.M.****CONVENTION HALL — 21st Floor**

WILLIAM L. CLARK, M.D., Presiding

**INVOCATION**

Dr. Burris Jenkins,

*Pastor, The Community Church, Kansas City, Missouri***ADDRESS OF WELCOME**

Honorable Bryce B. Smith,

*Mayor, Kansas City, Missouri***ADDRESS OF WELCOME**

Clarence S. Cappel, M.D.,

*President, Jackson County Medical Society***INDUCTION OF THE PRESIDENT-ELECT****ADDRESS:***Philosophizing on the Future of Physical Therapy*

John Severy Hibben, M.D., Pasadena

**THIRD ANNUAL WILLIAM BENHAM SNOW  
MEMORIAL LECTURE****PHYSICAL PROPERTIES OF BONE**

Arthur Steindler, M.D.

*Professor and Head of the Department of Orthopedic Surgery, State University of Iowa Medical School, Iowa City, Iowa.***CLINICAL CONFERENCES****SECTION ON MEDICINE AND  
MEDICAL SPECIALTIES****TUESDAY Morning, September 10****Private Dining Room E, 5th Floor**H. D. HOLMAN, M.D., *Chairman*

- 9:00 to 9:35. **Effective Methods of European Hydrotherapy Neglected in the United States of America.**  
 CHARLES I. SINGER, M.D. LONG BEACH, L. I.
- 9:35 to 10:10. **Fever Therapy in Multiple Sclerosis.**  
 WILLIAM H. SCHMIDT, M.D., Associate in Physical Therapy, Jefferson Medical College.  
 PHILADELPHIA, PENNSYLVANIA.
- 10:10 to 10:45. **Clinical Aspects of Short Wave Diathermy.**  
 W. H. EGAN, M.D., Assistant Clinical Professor of Medicine, Marquette University.  
 MILWAUKEE, WISCONSIN.
- 10:45 to 11:20. **Arthritis: Technic in the Application of Physical Measures.**  
 J. E. RUETH, M.D., Instructor, Marquette University Medical School; Staff, St. Joseph's Hospital; Director of Physiotherapy and Fever Therapy, Milwaukee County Hospital.  
 MILWAUKEE, WISCONSIN.
- 11:20 to 11:55. **Ultraviolet Irradiation: Indications, Limitations and Technic of Application.**  
 CLEON W. SYMONDS, M.D., Secretary Pacific Physical Therapy Association.  
 PASADENA, CALIFORNIA.

**CLINICAL CONFERENCES****SECTION ON MEDICINE AND  
MEDICAL SPECIALTIES****WEDNESDAY Morning, September 11****Private Dining Room E, 5th Floor**WILLIAM W. WORSTER, M.D., *Chairman*

- 9:00 to 9:35. **Radiathermy (Short Wave Diathermy) Fundamental Principles — Indications.**  
 DISRAELI KOBAC, M.D., Assistant Clinical Professor Medicine (Physical Therapy), Rush Medical College of the University of Chicago.  
 CHICAGO.
- 9:35 to 10:10. **Fever Therapy: — Results of Experiments and Clinical Studies in Pelvic Conditions.**  
 WILLIAM BIERMAN, M.D., Director, Department of Physical Therapy, Beth Israel and Sydenham Hospitals.  
 NEW YORK.
- 10:10 to 10:45. **Some Clinical and Physical Aspects of Ultrashort Waves.**  
 CONRAD K. GALE, M.D., Staff, Hospital of Joint Diseases.  
 NEW YORK.
- 10:45 to 11:20. **An Evaluation of Hydrotherapeutic Methods in the Arthritides.**  
 JOHN D. CURRENCE, M.D., Instructor in Medicine, College of Physicians and Surgeons, Columbia University.  
 NEW YORK.
- 11:20 to 11:55. **Physical Measures in Subdeltoid Bursitis (Motion Picture Demonstration).**  
 NATHAN H. POLMER, M.D., Assistant Professor of Clinical Medicine, Graduate School of Medicine, Tulane University of Louisiana.  
 NEW ORLEANS.

**CLINICAL CONFERENCES****SECTION ON SURGERY AND  
SURGICAL SPECIALTIES****TUESDAY Morning, September 10****Reception Room, 5th Floor**J. C. ELSOM, M.D., *Chairman*

- 9:00 to 9:35. **Corrective Exercise and Massage in Orthopedic Practice.**  
 F. H. EWERHARDT, M.D., Assistant Professor of Physical Therapeutics, Washington University School of Medicine.  
 ST. LOUIS.
- 9:35 to 10:10. **Technics of Physical Procedures in Gynecologic Practice.**  
 M. C. L. MCGUINNESS, M.D., Chief of Clinic, Department of Physical Therapy, Vanderbilt Clinic.  
 NEW YORK.
- 10:10 to 10:45. **Galvanic Treatment of Hemorrhoids.**  
 WILBUR E. KEESEY, M.D., Staff, Illinois Masonic and John B. Murphy Hospitals.  
 CHICAGO.
- 10:45 to 11:20. **Physical Therapy: The Twilight of Cancer Therapy.**  
 GUSTAV KOLISCHER, M.D., Senior Urologist, Michael Reese and Mount Sinai Hospitals.  
 CHICAGO.
- 11:20 to 11:55. **General Electrosurgery.**  
 GUSTAVUS M. BLECH, M.D., Attending Surgeon, Edgewater and Garfield Park Hospitals.  
 CHICAGO.

**CLINICAL CONFERENCES****SECTION ON SURGERY AND  
SURGICAL SPECIALTIES****WEDNESDAY Morning, September 11****Reception Room, 5th Floor**M. C. L. MCGUINNESS, M.D., *Chairman*

- 9:00 to 9:35. **Hemorrhoid Desiccation Under Local Anesthesia.**  
 GORDON D. GRAHAM, M.D., Staff, St. Boniface General Hospital.  
 WINNIPEG, CANADA.

- 9:35 to 10:10. **Corrective Exercise and Massage in Orthopedic Practice.**  
JAMES C. ELSOM, M.D., Associate Professor, Physical Therapy, University of Wisconsin Medical School.  
MADISON, WISCONSIN.
- 10:10 to 10:45. **Electrosurgical Removal of Accessible Neoplasms.**  
WILLIAM L. CLARK, M.D., President, American Congress of Physical Therapy.  
PHILADELPHIA, PENNSYLVANIA.
- 10:45 to 11:20. **Electrosurgical Obliteration of the Gall Bladder (Motion Picture Demonstration).**  
MAX THOREK, M.D., Surgeon-in-Chief, American Hospital; Attending Surgeon, Cook County Hospital.  
CHICAGO.
- 11:20 to 11:55. **Endocervicitis: Comparative Value of Physical Procedures Based on End Results.**  
A. DAVID WILLMOTH, M.D., Senior Surgeon, St. Anthony's Hospital.  
LOUISVILLE, KENTUCKY.

## CLINICAL CONFERENCES

SECTION ON EYE, EAR, NOSE AND THROAT  
TUESDAY Morning, September 10

## Private Dining Rooms A and B, 5th Floor

FREDERICK L. WAHRER, M.D., *Chairman*

- 9:00 to 9:35. **Diathermy in Rhinologic and Laryngologic Practice.**  
JOHN L. MYERS, M.D., Associate Professor of Otorhinolaryngology, The School of Medicine, The University of Kansas, Kansas.  
KANSAS CITY, MISSOURI.
- 9:35 to 10:10. **Value of Diathermy in Diseases of the Eye.**  
OSCAR B. NUGENT, M.D., Professor of Ophthalmology, Chicago Eye, Ear, Nose and Throat College and Hospital.  
CHICAGO.
- 10:10 to 10:45. **Control of Pain and Hemorrhage in Electrosurgical Tonsillectomy.**  
LEWIS J. SILVERS, M.D., Otolaryngologist, Ocean Hill Memorial Hospitals.  
NEW YORK.
- 10:45 to 11:20. **Physical Procedures in Otolaryngology.**  
ELLIS G. LINN, M.D., Staff, Iowa Methodist Hospital.  
DES MOINES, IOWA.
- 11:20 to 11:55. **Radiation in Ophthalmology and Otolaryngology.**  
M. H. COTTLE, M.D., Attending Otolaryngologist, Lutheran Memorial and Illinois Masonic Hospitals; Assistant Otolaryngologist, Children's Memorial Hospital.  
CHICAGO.

## CLINICAL CONFERENCES

## SECTION ON EYE, EAR, NOSE AND THROAT

## WEDNESDAY Morning, September 11

## Private Dining Rooms A and B, 5th Floor

OSCAR B. NUGENT, M.D., *Chairman*

- 9:00 to 9:35. **Surgical Treatment of Eye, Ear, Nose and Throat by Electricity.**  
T. S. BLAKESLEY, M.D., Staff, Trinity Lutheran, St. Luke's, Menorah and General Hospitals.  
KANSAS CITY, MISSOURI.
- 9:35 to 10:10. **Rationalization of Electrosurgery in Laryngology.**  
F. L. WAHRER, M.D., Staff, Deaconess Hospital, Marshalltown, Iowa; Otolaryngologist, Iowa Training School for Boys, Eldora, Iowa.  
MARSHALLTOWN, IOWA.
- 10:10 to 10:45. **Recent Experiences with Intranasal Ionization in Allergic Nasal Disease.**  
JOHN A. HURLBUT, M.D., Otolaryngologist, Methodist Hospital.  
MADISON, WISCONSIN.

- 10:45 to 11:20. **Ionization in Hay Fever: Indications, Technic, Scope.**  
BEN L. BRYANT, M.D., Attending Otolaryngologist, Good Samaritan Hospital.  
CINCINNATI, OHIO.
- 11:20 to 11:55. **Histopathologic Changes of the Nasal Mucosa in Vasomotor Rhinitis Induced by Zinc Ionization.**  
A. R. HOLLENDER, M.D., Instructor in Laryngology, Rhinology, and Otolaryngology, University of Illinois College of Medicine.  
CHICAGO.

## CLINICAL CONFERENCES

## SECTION ON COLONIC THERAPY

## TUESDAY Morning, September 10

## Convention Hall — 21st Floor

JAMES W. WILTSIE, M.D., *Chairman*

- 9:00 to 9:30. **Uses and Abuses of Colonic Therapy.**  
J. W. TORBETT, M.D., and  
J. W. TORBETT, Jr., M.D., Torbett Sanatorium.  
MARLIN, TEXAS.
- Discussion: M. C. L. McGuinness, M.D., New York; Cora Smith King, M.D., Hollywood, Cal.
- 9:30 to 10:00. **Physical, Therapeutic and Dietetic Management of the Gastrointestinal Tract in Chronic Arthritis.**  
EPHRAIM GOLDFAIN, M.D., Instructor, Neurology, University of Oklahoma School of Medicine; Staff, Reconstruction, University and Wesley Hospitals.  
OKLAHOMA CITY, OKLA.
- Discussion: J. Edward Johnson, M.D., Mineral Wells, Texas; W. C. Menninger, M.D., Topeka, Kansas.
- 10:00 to 10:30. **Effect of Allergy, Heat, Light, Effort and Cold Sensitiveness upon Disorders in the Gastrointestinal Tract.**  
W. W. DUKE, M.D., Past-President, Allergy Association.  
KANSAS CITY, MISSOURI.
- Discussion: Lynn Walker, M.D., Milwaukee, Wisconsin; J. Anthony Kelly, M.D., Philadelphia, Pennsylvania.
- 10:30 to 11:00. **Constipation as a Physiotherapeutic Problem.**  
WILLIAM S. HORN, M.D., Chief, Medical Staff, Morris Hospital.  
FORT WORTH, TEXAS.
- Discussion: Norman M. Smith, M.D., Minneapolis, Minn.; J. W. Torbett, Sr., M.D., Marlin, Texas.
- 11:00 to 11:30. **Place of Colonic Therapy in the Practice of Medicine.**  
WILLIAM W. WORSTER, M.D., Associate Professor Therapeutics (Physical Therapy), College of Medical Evangelists, Loma Linda, Calif.; President, Southern California School of Physical Therapy.  
SAN GABRIEL, CALIF.
- Discussion: Wm. A. Hinckle, M.D., Peoria, Ill.; John S. Hibben, M.D., Pasadena, California.
- 11:30 to 12:00. **Results and Observations in over 1,000 Cases Treated by Colonic Therapy.**  
JAMES W. WILTSIE, M.D.  
BINGHAMTON, NEW YORK.
- Discussion: M. G. Spiesman, M.D., Chicago; Frank Farmer, M.D., Los Angeles, California.

## GENERAL SCIENTIFIC SESSION

## MONDAY Afternoon, September 9 — 2 P.M.

## Convention Hall — 21st Floor

WILLIAM BIERMAN, M.D., *Chairman*

## SYMPOSIUM ON GYNECOLOGY

101. **Further Studies in Endocervicitis: Its Pathology and Treatment.**  
WILLIAM EDWIN GROUND, M.D., Staff Surgeon, St. Mary's Hospital.  
SUPERIOR, WISCONSIN.

102. **Cervicitis: Five Years Experience with Diathermy.**  
M. A. ROBLEE, M.D., Assistant in Clinical Obstetrics and Gynecology, Washington University School of Medicine.

ST. LOUIS, MISSOURI.

103. **Simplifying the Radium Technic in Treating Uterine Cancer.**

HAROLD SWANBERG, M.D., Editor, *The Radiological Review*; Radiologist, St. Mary's and Blessing Hospitals.

QUINCY, ILLINOIS.

Discussion: Robert Douglas Irland, M.D., Kansas City, Missouri; A. David Willmoth, M.D., Louisville, Kentucky; A. F. Tyler, M.D., Omaha, Nebraska.

104. **Light and Its Application to the Irradiation of Foods.**

HENRY T. SCOTT, M.D., Wisconsin Research Foundation.

MADISON, WISCONSIN.

Discussion: Carl Ferdinand Nelson, Ph.D., M.D., Lawrence, Kansas; C. I. Reed, Ph.D., Chicago.

105. **Present Status of Fever Therapy for Dementia Paralytica in the State Hospitals of Illinois.**

RALPH H. KUHN, M.D., Instructor in Neuropsychiatry, University of Illinois College of Medicine; Attending Psychiatrist Cook County Bureau of Public Welfare.

CHICAGO.

Discussion: L. E. Hanisch, M.D., Omaha; Wm. H. Schmidt, M.D., Philadelphia; Edward Thomas Gibson, M.D., Kansas City, Missouri.

106. **Bio-Mechanics: A New Method of Studying Physical Disabilities.**

CHARLES MURRAY GRATZ, M.D., Instructor, Orthopedic Surgery, College of Physicians and Surgeons, Columbia University; Assistant Attending Orthopedic Surgeon, Post-Graduate Hospital; Assistant Visiting Surgeon (Traumatic Division) City Hospital.

NEW YORK.

Discussion: Arthur Steindler, M.D., Iowa City, Iowa; Theodore P. Brookes, M.D., St. Louis; F. W. Carruthers, M.D., Little Rock, Arkansas.

## GENERAL SCIENTIFIC SESSION

TUESDAY Afternoon, September 10, 2 P.M.

Convention Hall—21st Floor

JOHN D. CURRENCE, M.D., *Chairman*

### SYMPOSIUM ON ARTHRITIS

201. **An Experimental Study of Mecholyl Iontophoresis.**  
A. J. KOTKIS, M.D., Senior Instructor, Internal Medicine, St. Louis University School of Medicine; Chairman, State Committee on Physical Therapy to the Missouri State Medical Association.

ST. LOUIS, MISSOURI.

202. **Underwater Therapy in the Treatment of Chronic Arthritis.**

EUCLID M. SMITH, M.D., Associate Attending Physician, Medical Service, Leo N. Levi Hospital.

HOT SPRINGS, ARKANSAS.

203. **Clinical Experience in the Treatment of Arthritis with Concentrated Vitamin D.**

C. I. REED, Ph.D., Assistant Professor of Physiology, University of Illinois College of Medicine.

CHICAGO.

Discussion—Symposium on Arthritis: David H. Kling, M.D., Los Angeles; John S. Coulter, M.D., Chicago; James Martin, M.D., Omaha, Nebraska; J. F. Shuffield, M.D., Little Rock, Ark.; Sim Driver, M.D., Dallas; Franz Nagelschmidt, M.D., London, England.

204. **Progress in Intestinal Electrosurgery.**

ALFRED STRAUSS, M.D., Attending Surgeon, Michael Reese Hospital.

CHICAGO.

Discussion: Gustav Kolischer, M.D., Chicago; H. C. Miller, M.D., Omaha, Nebraska; Wm. E. Ground, M.D., Superior, Wis.

205. **Mechanical and Physiological Principles Underlying Prevention of Deformity and Disability.**

VERNON L. HART, M.D., Instructor Orthopedic Surgery, Medical School, University of Minnesota; Staff, University, Swedish, St. Mary's and St. Andrew's Hospitals.

MINNEAPOLIS, MINNESOTA.

206. **Prevention of Disabilities in Fractures.**

W. L. ESTES, JR., M.D., Chief Surgeon of St. Luke's Hospital.

BETHLEHEM, PENNSYLVANIA.

207. **Hallux Valgus: Post-operative Physical Therapy (Motion Picture Demonstration).**

THEODORE P. BROOKES, M.D., Instructor in Clinical Orthopedic Surgery, Washington University School of Medicine; Staff, Washington, University, Lutheran, Deaconess Hospitals, and City Institutions.

ST. LOUIS, MISSOURI.

Discussion of the foregoing three papers: L. V. Parmley, M.D., Little Rock, Arkansas; F. H. Walke, M.D., Shreveport, La.; F. H. Ewerhardt, M.D., St. Louis, Missouri; J. C. Elsom, M.D., Madison; P. Merritt Girard, M.D., Dallas; Clarence B. Francisco M.D., Kansas City, Kansas.

TUESDAY Evening, September 10, 8 P.M.

### JOINT SESSION

## AMERICAN CONGRESS OF PHYSICAL THERAPY

and the

### JACKSON COUNTY MEDICAL SOCIETY

JOHN SEVERY HIBBEN, M.D. }  
CLARENCE S. CAPELL, M.D. } *Co-Chairmen*

### Unemployability: A Medical Problem.

BERNARD FANTUS, M.D., Professor of Materia Medica, Pharmacology and Therapeutics, University of Illinois College of Medicine; Director of Therapeutics, Cook County Hospital.

CHICAGO.

### Present Status of Physical Medicine in the Treatment of Disease.

FRANZ NAGELSCHMIDT, M.D.

LONDON, ENGLAND.

### Volkman's Ischemic Contracture.

HENRY W. MEYERDING, M.D., Section of Orthopaedic Surgery, Mayo Clinic.

ROCHESTER, MINNESOTA.

WEDNESDAY Afternoon, September 11, 2 P.M.

## GENERAL SCIENTIFIC SESSION

Convention Hall—21st Floor

JOHN S. HIBBEN, M.D., *Chairman*

### SYMPOSIUM ON SHORT WAVE DIATHERMY

301. **A Review of the Basis and Indications of Short Wave Therapeutics: Short Wave Fulguration and Coagulation.**

DR. L. H. STIEBOECK, Director Short Wave Institute, Sanatorium Löw.

VIENNA, AUSTRIA.

302. **The Generation of High Frequency Currents. Discussion of Concepts, Units and Radio Circuits as Applied to Short-Wave Diathermy.**

HOWARD A. CARTER, B.S. in M.E., Secretary, Council on Physical Therapy, American Medical Association.

CHICAGO.

303. **Experimental and Clinical Investigation of Short and Ultrashort Radiotherapy (Radiathermy).**

DAVID H. KLING, M.D., Assistant Professor of Orthopedics, College of Medical Evangelists, Loma Linda, California; Director of Arthritis Department, Cedars of Lebanon Hospital.

LOS ANGELES, CALIFORNIA.

Discussion—Short Wave Symposium: Disraeli Kohak, M.D., Chicago; W. H. Egan, M.D., Milwaukee, Wisconsin; William Bierman, M.D., New York.

304. **Treatment of Cancer of the Lip by Massive Doses of X-Ray.**

LESTER HOLLANDER, M.D., Associate Professor, Department of Dermatology, School of Medicine, University of Pittsburgh; Medical Director, Pittsburgh Skin and Cancer Foundation.

PITTSBURGH, PENNSYLVANIA.

Discussion: Lewis G. Allen, M.D., Kansas City, Kansas; Roy W. Fouts, M.D., Omaha, Neb.; R. O. Patterson, M.D., Little Rock, Ark.; Joseph L. McDermott, M.D., Kansas City, Missouri.

**305. Treatment of Acne Vulgaris.**

ERWIN P. ZEISLER, M.D., Assistant Professor of Dermatology, Northwestern University Medical School; Attending Dermatologist Michael Reese Hospital.

CHICAGO.

Discussion: Charles C. Dennie, M.D., Kansas City, Missouri; R. O. Patterson, M.D., Little Rock, Ark.; Theodore Greiner, M.D., St. Louis.

**306. Radium Therapy in the Curable Field of Malignancy.**

EDWARD H. SKINNER, M.D., Special Lecturer on Radiology and Oncology, Kansas City Dental College; Consulting Radiologist at Kansas City General, St. Mary's, Cushing Memorial, (Leavenworth); Chief, Roentgen Department St. Luke's Hospital.

KANSAS CITY, MISSOURI.

Discussion: A. F. Tyler, M.D., Omaha, Nebraska; Harold Swanberg, M.D., Quincy, Ill.; Roscoe L. Smith, M.D., Lincoln, Nebraska.

**THURSDAY Morning, September 12, 9 A.M.****GENERAL SCIENTIFIC SESSION****Convention Hall — 21st Floor**

A. J. KOTKIS, M.D., *Chairman*

**401. Intrapleural Pneumolysis.**

LEWIS J. MOORMAN, M.D., Medical Director, The Farm Sanatorium.

OKLAHOMA CITY, OKLAHOMA.

**402. Cavities and Collapse Therapy in Pulmonary Tuberculosis.**

BENJAMIN GOLDBERG, M.D., Associate Professor of Medicine; University of Illinois College of Medicine; Formerly Medical Director, Chicago Municipal Tuberculosis Sanatorium.

CHICAGO.

Discussion of foregoing papers: Alexis M. Forster, M.D., Colorado Springs, Colorado; G. D. Kettelkamp, M.D., Koch, Missouri.

**SYMPOSIUM ON ELECTROSURGICAL RESECTION OF THE PROSTATE****403. Present Trends in the Management of the Hypertrophied Prostate.**

IRA R. SISK, M.D., Professor of Urology, University of Wisconsin Medical School.

MADISON, WISCONSIN.

**404. Transurethral Prostatic Resection.**

W. F. BRAASCH, M.D., Professor of Urology, The Mayo Foundation, Graduate School, University of Minnesota.

ROCHESTER, MINNESOTA.

**405. Prostatic Resection.**

GILBERT J. THOMAS, M.D., Assistant Professor of Urology, Medical School and Graduate Medical School, University of Minnesota; Attending Urologist at Eitel Hospital, St. Mary's Hospital, Glen Lake Sanatorium, Glen Lake, Minnesota.

MINNEAPOLIS, MINNESOTA.

Discussion — Resection Symposium: John R. Caulk, M.D., St. Louis; Herbert F. H. Jones, M.D., Little Rock, Arkansas; Thomas D. Boler, M.D., Omaha, Nebraska; Montague L. Boyd, M.D., Atlanta.

**406. Treatment of Erysipelas by Ultraviolet Radiation.**

M. E. Knapp, M.D., Director, Department of Physical Therapy, General Hospital.

MINNEAPOLIS, MINNESOTA.

Discussion: Norman E. Titus, M.D., New York; C. W. Symonds, M.D., Pasadena; Erwin P. Zeisler, M.D., Chicago.

**THURSDAY Afternoon, September 12, 2 P.M.****EDUCATIONAL CONFERENCE****Convention Hall — 21st Floor**

WM. BIERMAN, M.D., *Chairman*

**407. Report of the Committee on Technicians' Registry.**

WM. BIERMAN, M.D., Director, Department of of Physical Therapy, Beth Israel and Sydenham Hospitals.

NEW YORK.

**408. Publications and Meetings Dealing with Physical Therapy.**

DISRAELI KOBAC, M.D., Assistant Clinical Professor Medicine (Physical Therapy), Rush Medical College of the University of Chicago.

CHICAGO.

**409. The New York Physical Therapy Society.**

M. C. L. MCGUINNESS, M.D., Chief of Clinic, Department of Physical Therapy Vanderbilt Clinic.

NEW YORK.

**410. The Pacific Physical Therapy Association.**

WM. WORSTER, M.D., Associate Professor Therapeutics (Physical Therapy), College of Medical Evangelists, Loma Linda, Calif.; President, Southern California School of Physical Therapy.

SAN GABRIEL, CALIF.

General Conference and Informal Discussion

**SCIENTIFIC EXHIBITS**

American Medical Association—Council on Physical Therapy.  
Simon Benson, Ph.D., Chicago.

William Bierman, M.D., New York.

John Stanley Coulter, M.D., Chicago.

John D. Currence, M.D., New York.

Charles Murray Gratz, M.D., New York.

Lester Hollander, M.D., Pittsburgh, Pennsylvania.

A. R. Hollender, M.D., Chicago.

David H. Kling, M.D., Los Angeles.

Henry W. Meyerding, M.D., Mayo Clinic, Rochester.

Harold Swanberg, M.D., Quincy, Illinois.

Max Thorek, M.D., Chicago.

Erwin P. Zeisler, M.D., Chicago.

**TECHNICAL EXHIBITS**

Adlanco X-Ray Corporation.

A. S. Aloe Company.

Archives of Physical Therapy, X-Ray, Radium.

Battle Creek Food Company.

The Burdick Corporation.

Cameron Surgical Specialty Company.

Comprex Oscillator Corporation.

Conducto-Therm Corporation.

Electrical Research Laboratories.

Electro Therapy Products Corporation and the E. J. Rose Mfg. Company.

H. G. Fischer & Company, Inc.

Lee De Forest Laboratories.

General Electric X-Ray Corporation.

Greb X-Ray Company.

Hanovia Chemical & Mfg. Company.

C. Coy Honsaker.

Paul E. Johnson, Mfrs.

Lepel High Frequency Laboratories, Inc.

McIntosh Electrical Corporation.

Merck & Company, Inc.

Philip Morris & Company, Ltd.

W. A. Rosenthal X-Ray Company.

The Von Corporation.